

THE BIOLOGIST



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A MESSAGE

From Our New Vice-Chancellor

To the Chapters of Phi Sigma:

As the newest member of the National Council, I appreciate this opportunity to greet the chapters and to assure them of my devotion to their interests. Let us forward the work of Phi Sigma, which is nothing less than, eventually, to make our organization synonymous with biology in America.

MELVILLE H. HATCH,
University of Washington, Seattle, Washington.

LOUIS F. HENDERSON

Honorary Member of Phi Sigma

THE Phi Sigma Society may consider itself fortunate in being privileged to number among its honorary members Louis Forniquet Henderson, Research Professor of Botany and Curator of the Herbarium at the University of Oregon and one of the pioneer botanists of the Northwest.

The son of John Henderson, Jr. and Catherine Leland, Louis was born at Roxbury, near Boston, Massachusetts, September 17, 1853, but before Louis was thirteen years old, the family had resided in Missouri, Louisiana, and Mississippi. His father, an abolitionist, was killed in the latter state in a riot in 1866, whereupon his mother took a position as matron in a military school in Vermont.

Henderson first became interested in botany when, a sophomore at Cornell University (1871-72), he enrolled in a class under the instructorship of David Starr Jordan, then a senior at the same institution. Following graduation at Cornell (1874), Henderson went west. He taught Latin, French, and Spanish a year (1874-1875) at the Miles Military Academy at Oakland, California, and botany, history, and modern languages in the Albany Collegiate Institute at Harrisburg, Oregon

(1875-1876). The next year he followed the principal of this institute into the public school system of Portland, Oregon where he remained for twelve years (1877-1889). In 1883 he married Miss Kate Robinson, who is, together with Professor Henderson, a charter member of Alpha Mu Chapter, and they became the parents of two daughters.

So began Professor Henderson's botanical explorations in the Northwest. He tells us how he had generously been provided with railroad passes to further his botanical researches, so that, without transportation expense, he was able to extend his exploration in every direction. "My regular plan during the spring," he tells us, "... was to rush home Friday afternoon after work was done, hastily change into working clothes, and then 'jump a train' ... I would travel till daylight was breaking in the morning, work all day collecting, and then board the first night train, passenger or freight, for home. That method of operation often gave me from 2 to 3 in the morning to 9 o'clock at night, or a day of 16 to 18 hours! ... This was sometimes in eastern Oregon and the Blue Mountains, sometimes in southern Oregon. Every few weeks I would find some new plant, which would repay me for all my labors."

The summer vacations would witness more extensive expeditions: Mt. Hood, Mt. Adams, the Three Sisters, the Oregon Coast, the Tacoma region.

Professor Henderson's important contribution during these years was in supplying the botanists in the East with specimens that served materially to advance the knowledge of our western flora. Asa Gray, Sereno Watson, George Engelmann, George Vasey, Frank S. Scribner, Leo Lesquereux, C. P. Sargent, B. S. Robinson, M. S. Fernald, J. M. Greenman, N. S. Britton were some of the men with whom he was in correspondence. Thomas Condon, C. C. Parry, C. G. Pringle, C. V. Piper, Dr. Henry Bolander, Dr. R. D. Nevius, M. W. Gorman, Thomas Howell—these were some of his more intimate botanical friends in the Northwest.

In 1889 a severe siege of typhoid fever caused Professor Henderson to give up teaching, and he spent three years (1889-1892) in Olympia, Washington, in the abstracting business with his brother. Then came a year (1892-1893) in the employ of the Chicago World's Fair Commission of the State of Washington, assembling a collection of the flora and of the forestry products of the state for exhibition at the fair. From 1893 to 1909 Henderson served as professor of botany at the University of Idaho.

During all these years, of course, Henderson's botanical explorations continued and his herbarium grew apace. Especially noteworthy was a

botanical reconnaissance of central Idaho, which he undertook in 1895 for the United States Department of Agriculture. And then—tragedy—the large university building in which Professor Henderson kept his herbarium burned! Gone was the labor of twenty-five years. Thankful must its owner have been that he had distributed his materials widely as he collected them.

There followed two years of fruit farming at Moscow and thirteen years at Hood River, Oregon, accompanied, of course, by continuous collecting to replace and extend the herbarium that had been destroyed.

Since 1924 Professor Henderson has been in charge of the herbarium at the University of Oregon in Eugene, and every year still finds him in the field at the work that he loves. He is, according to Professor Albert R. Sweetser of the University of Oregon, the most conversant with the flora of the State of Oregon of any man now living.

The following paragraphs by Professor H. P. Barss of the Oregon State College convey better than any recounting of dates the essence of Professor Henderson's personality.

"Professor Louis F. Henderson is the grand old man of Botany of the Pacific Northwest, the last of the pioneer botanists of this region. To know personally this hale and stalwart octogenarian is to love and admire him as a man. To know of his accomplishments in the extension of knowledge regarding the flora of this territory is to respect and honor him as a scientist. Modest, sincere, uninterested in material things, self effacing, scholarly in his instincts, keen and critical in his judgment, indefatigable, dynamic, he stands an example and an inspiration to our younger scientists.

"He seems to have found the fountain of eternal youth in his love for plants. For nearly sixty years, as opportunity has afforded, he has explored the plant life throughout this last frontier area of our country. Afoot, on horseback, by wagon, by auto, he has travelled far and wide, with his collecting case and plant press, studying the vegetation, searching out new and rare species, accumulating invaluable information about plant distribution. No mountain was too steep, no trail too long, no thicket too dense to discourage his zeal or dampen his enthusiasm for botanical adventure and discovery.

"His eightieth summer saw this white-haired, white-bearded patriarch tramping over the desert of Eastern Oregon and through the forests, along the lakes and streams of northern California searching for plants with his kindly, penetrating eye, getting up at dawn to change the driers in his presses before the day's collecting began.

“At the University of Oregon Herbarium, where he serves as curator, it has been his custom day after day, week after week, year in and year out, to start work at seven in the morning and continue his labors on his beloved plants till three or four in the afternoon. His friends and colleagues drop in for a chat and contend that he should let up a bit, but raising his broad shoulders from the specimen he has been studying, he looks at his visitors with clear, smiling eyes and his rich stentorian voice bursts forth with a vigorous protest that there is nothing in the world so satisfying to his soul as the hours he can spend, for the sake of science, with his plants.”

To the Chapter Secretaries:

No one cares for advice or suggestions given gratis, and particularly when such advice and suggestions are not requested. Hence in writing what follows I risk unpopularity; but, after all, if each chapter secretary realizes the importance of his office, Phi Sigma will be very materially benefited.

By the time this reaches you, you should have the long letter sent to each chapter secretary. My one bit of advice, my single suggestion, my only request is that you really read this letter, become familiar with its contents, keep it handy during the year, and know the more commonly used parts of the National Constitution.

If this is done, all will run smoothly, and your relations with this office will be as they should be.

DR. A. I. ORTENBURGER,
National Secretary.

Social tact is making your company feel at home, even though you wish they were.

A minister, attempting eulogy in a funeral sermon: “We have here only the shell; the nut is gone.”

Sometimes it is advisable to begin love letters: My dear sweetheart and gentlemen of the jury.”

The best reducing exercise is to shake the head violently from side to side when offered a second helping.

—*Readers Digest*

THE CHANCELLOR'S MESSAGE

To the Members of Phi Sigma:

The National Council meets in Denver on March 16th and 17th. Are there matters under consideration in your chapter which should be brought to our attention at that time? Are there suggestions which you, personally, desire to communicate to me for informal consideration at the Council Meeting?

At Denver will be your most efficient National Secretary, Dr. Ortenburger, without whom there can be no national meeting of any kind. He sees all, knows all. Every spare moment of his time, every effort of which he is capable is devoted to the interests of Phi Sigma. There will be our new Vice-Chancellor, Dr. Hatch, who has many ideas for the future development of the organization. There will be Dr. Keefe who finds time among his many duties to produce for you a new type of BIOLOGIST. Keefe is not only your editor. He is your friend, your publicity director, one of your most active national officers. Then there will be the oldest member of the National Council, the host to the Council meeting, Mr. Stewart. You may have met Stewart. If you have, you know why it is that he is now, and nearly always has been, the watch dog of your treasury. Meet, then, your national officers. Know that they are all mighty good fellows, that they want nothing more than a bigger and better Phi Sigma, that they need your help and that every idea which you present to them will be carefully studied at the meeting in Denver.

The Chicago Convention was a great success. Your delegates were so well selected that I appointed nearly every one of them on important committees. The committees did so well that their reports met with almost unanimous approval on the floor of the Convention. Matters ran so smoothly that I hardly knew that a Convention was in progress. The scientific program was extensive and excellent. Every delegate came to Chicago to work, did his work well, and, as far as I know, went home happy.

Support your national officers for the next four years as the Convention delegates did, and we shall go far together.

PAUL A. WARREN.

The Role of the Individual in the History of Science

By MELVILLE H. HATCH

(Given at the Installation of the Alpha Mu Chapter of Phi Sigma at
Corvallis, Oregon, November 18, 1933)

FOR quite a few years I have been much interested in the study of the history of science. For the past three years I have been giving a course of about twenty lectures at the University of Washington in the History of Zoology. So that I have come to have a considerable interest in the subject.

By its enthusiasts, the study of the history of science is hailed as one of the most educational and cultural influences of the age. It is espoused as the one aspect of human history that is truly progressive, in which each century builds surely on the achievements of the centuries of its predecessors.

For, as Sarton tells us, modern saints are no more saintly than those of old, modern politicians are no more wise or able, modern artists with no better appreciation of beauty. But modern scientists do know more than their forerunners, because they have been able surely and firmly to build on the foundations laid and established by those before them.

The opponents of the study of history of science have not made themselves heard. I imagine that these persons are far too absorbed making new discoveries in their laboratories to be paying any attention. For the real enemies of any intellectual cause are never those who put up an opposition, no matter how loud or vociferous. Such opponents are always next of kin to the proponents. The two are operating on the same basic presuppositions, see things from much the same point of view, really have far more in common than otherwise.

Thus the real enemies of theism are not the atheists but rather those persons for whom the whole problem is false. The real enemies of the realistic Platonic schoolmen of mediaeval Europe were not the nominalistic Aristotelians against whom they shouted so loudly, but the race of scientists, as yet practically unborn, who would cast the whole scholastic argument into the limbo of forgotten things.

An argument against the pursuit of science history might be formulated somewhat as follows: A rising interest in the study of the process

whereby science develops may well indicate a deterioration of the process itself. The human mind inevitably, in periods of degeneracy, turns from objective studies to the study of its own functioning. Therefore, the argument would run, let us stick to the study of science itself, let us not wander, let us not vitiate the objectivity, the virility of our work.

Now, mind you, I have never actually heard such an argument advanced by anyone, and I do not know whether anybody else has, either. But I have known persons whom, I felt, have had slight sympathy for science history,—there are probably some such in this very audience—and this might well be the argument that they would give.

And, the worst of it is, the argument may be true. As Socrates and the Sophists followed the Ionian philosophers,—as the Alexandrians and the Schoolmen followed Aristotle,—so may the students of science history, themselves unable to perform the feats of a Newton, a Darwin, or an Einstein, initiate a new scholasticism by forever mumbling over the lives and deed of the departed.

In extenuation of such studies, however, let me cite two things:

(1) If we are, indeed, the symbol of a neoscholasticism—a fact I am far from admitting—then at least we are the result rather than the cause of the movement! Allow us, at least, that comfort.

But my best argument is my second, namely the hope to convince you that, properly conceived, science history can be made no less objective than any other phase of science.

The problem is, I believe, a legitimate, a definite, and a scientific one—the problem of describing and, perhaps someday, explaining the succession of scientific study and discovery.

It is to one small segment of this problem that I would direct your attention for a few minutes this evening,—a small but, to my mind, a fundamental aspect of the field.

At the basis of all scientific activity is the activity of the individual scientist. That is of course, a perfectly trite statement, the truth of which is at once apparent to all of you. But my thesis is—perhaps this is equally self-evident—that one of our best hopes of understanding the course of science history lies in acquiring an understanding of the activity of the individual scientist.

I do not care to be led into stating that the course of science is exclusively a matter of individual careers. Science history has its sociological as well as its individual aspect. And the sociological aspect is very important and justifies careful and detailed study. However, in

my discourse this evening, I am deliberately confining myself to a survey of the nature of the individual's contribution.

Science history has, up to the present time, been concerned almost exclusively with the chronicle of the great, the outstanding scientific events. This has been proper, of course. Every reconnaissance of an unexplored territory takes account of the major features first. But eventually the details must be surveyed and the picture completed.

Well and good, then, you say, let us to it. Let us go to the individual scientists and complete our story.

The answer to that, of course, is to go and try it and see. If you ever try it you will be confronted, except in the case of a few leaders, with an extreme paucity of data. But even where one gets an abundance of data of the conventional kind, the impression has grown on me, at any rate, that many of the essential facts are still missing. Many of the mainsprings of the human motives involved are still hidden from our view.

It will do no good to page the psychologist. He will tell you that such a complicated thing as a motive is far beyond his power to understand or analyze.

We are on untrodden ground, or, at least, in a terrain traversed only by the novelist or literary biographer.

My own experience is—and there is little else to go on in this difficult field—my own experience is that a human life is composed of more or less alternating periods of depression and stimulation—something like our economic life. These periods are short, usually a few days or a week or so at most. In large measure they may be determined by internal physiological factors—we don't know. But periods of depression, at any rate, usually appear to be initiated by something external, a trifling irritation or interruption or opposition in one's work, for example. I can remember, once, when my failure satisfactorily to separate two species of ground beetles that I thought I ought to know started quite a tempest in a tea-pot!

Now such a short and frequently repeated cycle is quite beyond the scope of almost the best biographical investigation. Even the most faithfully kept diary would probably fail to do full justice to it. Nevertheless, I venture, at least as a preliminary hypothesis, the view that this cycle, now normal, now exaggerated in one phase, now exaggerated in another, is a very important factor in accounting for such intimate and creative aspects of human activity as artistic and scientific and other work that draws on the innermost capacities and capabilities of the individual.

More or less lengthily sustained moods have probably been drawn upon frequently by the biographers of artists, poets, novelists, and so forth, in developing the lives of their subjects. I must confess to an almost total ignorance of such literature—a deficiency which it would probably be well to overcome if I am to raise my suggestion above the level of a bare hypothesis.

I can cite but one case where some such factor as I have in mind has been called into play by a biographer.

Nathaniel W. Stephenson, Professor of History and Biography at Scripps College in California, in writing on Abraham Lincoln in the last edition of the *Encyclopaedia Britannica* says (ed. 14, vol. 14, 1929, p. 141):

“In 1860 Lincoln was in one of those rising tides of energy that had come and gone throughout his life. Its culmination was reached on Dec. 20, the very day on which South Carolina seceded. Congress had met; it was believed that a compromise could be made with the Slave States on the basis of a division of the territories between slavery and freedom. Thurlow Weed had come to Springfield on behalf of the Republican leaders to find whether Lincoln would participate in compromise. On Dec. 20 he closed the door by issuing an ultimatum: he insisted on complete exclusion of slavery from the territories but he would promise to let Slavery alone in the States . . . This decision put an end to compromise and led straight to war. The next 18 months form the most singular period in Lincoln’s life. They are his last period of the ebb tide. During this period he is often at the mercy of his indecision. And yet, from this welter of uncertainty he issues suddenly, in July, 1862, the final Lincoln, sure of himself and master of his world.”

Let us now consider the different ways in which a man’s life may be put to the service of science. As a preliminary attempt at analysis, I propose to recognize three types of scientific careers: (1) the *normal* type, (2) the *precocious* type, and (3) the *incidental* type.

There is, then, first of all, the normal type of scientific career or life-cycle. The proper understanding of this is most important both for a general understanding of the way in which scientific discovery and progress is made and for an understanding of the other two.

In the normal scientific life-cycle, the individual starts out as a young man—rarely a young woman!—and slowly, bit by bit, acquires the knowledge, the experience, and the other “intellectual furniture” that is required. Eventually, sooner or later, the young investigator comes to develop a point of view, and then he spends the remainder of

his days working out the implications of his view point. Or, to express the matter in another way, the mind finds its own groove or rut and continues to run along it to the end of the chapter.

This inelasticity of the mind is frequently heralded as a defect—this conservatism of the middle-aged and elderly men. From the point of view of the advancement of science this is not the case. If ideas and view points are worthy of being formulated in the first place, they are worthy of having their intricacies and implications explored. Now, if the human mind were so constituted that it remained perpetually a *tabula rasa*, a smoothed tablet, continually ready for the reception of fresh impressions, for new ideas—why, we would get nothing, especially in these days of rapid change in scientific theories and procedures, except a continuous series of “half-baked” ideas, with no one of them given the criticism and testing of which it is worthy.

Fortunate it is, I believe, that the mature mind clings with persistency, even stubbornness, to that which it has attained, rejoicing in the repeated examination of the old rather than dashing off after every new phantom on the horizon.

But, you say, this is to oppose progress, and progress is the essence of modern science.

I deny this, and for two reasons:

(1) Progress in science results in important measure from the continued and painstaking accumulation of data,—which is exactly the process I have been describing,—and not entirely from the formulation of new hypotheses and theories.

And (2) the new hypotheses and theories are ever provided for by the oncoming generation of young scientists, whose minds in their turn will crystallize around their notions, and the process be repeated all over again.

Thus Darwin, in 1859, upon the publication of his *Origin of Species*, did not look for adherents to his ideas from his contemporaries. They—the Agassiz's and others,—had already their minds made up and there were many and important zoological problems to which they were devoting themselves with enthusiasm and profit. It was to the young scientists just coming on—the Huxley's, the Haeckel's, the Gegenbauer's—that Darwin looked to for the support of evolution with a confidence that was entirely justified by the event.

But, before they died, these men, just like Agassiz before them, found themselves with outmoded ideas. Evolutionary speculation gave

way to detailed morphology and embryology, and these studies in their turn, in part, have given way to experimentation.

Examples of a normal scientific life-cycle are not difficult to find.

As an initial example I cite the celebrated Bohemian coleopterist, Edmund Reitter. He was born in 1845 and published his first paper on beetles in 1869, at the age of twenty-four years. Two years later he published in the *Verhandlungen des naturforschenden Vereins in Brunn*, *Transactions of the natural science society of Brunn*—the same journal in which Mendel had published his subsequently celebrated paper some four years before—in this journal Reitter now published a hundred and forty page monograph on the European species of *Meligethes*, a genus of Nitidulidae.

There followed this, in almost uninterrupted course, for nearly fifty years, until his death in 1920, a series of papers and monographs on Coleoptera, mostly of the European fauna. At the end of ten years 96 titles had appeared, at the end of twenty years 283—after thirty years 548—and by 1915, after forty-six years, 949. I do not happen to know what the grand total was in 1920 at the time of Reitter's death.

In a research field of this type in which the work is largely descriptive and analytical, it is not always easy to detect a climax. In Reitter's case, however, the climax is, perhaps, indicated by the appearance, between 1908 and 1916, when the author was between sixty-three and seventy-one years of age, of the *Fauna Germanica. Die Kafer*, a five volume work in over 1600 pages on the beetles of Germany.

I have not selected Edmund Reitter because he was one of the great biologists of all time. He cannot so be classed. Nor need any of you consider your knowledge of biological history especially deficient because you have never heard of him. In fact, his obscurity has one merit, it enables us to view him with complete objectivity. I have selected Edmund Reitter for mention because his career contains so much that is symptomatic of the average hard-working scientist. Not that many of us rise to the level of 949 publications! Not that it is at all desirable that we should! But the essential features of a normal scientific career are here.

These are, again:

- (1) The selection of a field as a young man.
- (2) The early crystallization—the *Meligethes* monograph—on the type of work to be done, on the attitude and point of view to be taken, on the methods to be followed.
- (3) The eventual rise to a climax—the *Fauna Germanica*—the synthetic work which shall contain the summation of the previous years of

data gathering. However different the summation appears on the surface, it will usually be found to be quite completely implied or circumscribed by the set of ideas and view points adopted by the investigator in his youth.

As the tree, though delayed in its maturity for a score or more of years, is delimited by the characteristics of the seed; so are most of the scientific generalizations of twenty-five and thirty years hence fixed and implied in the attitudes of persons at the present just starting on their scientific careers.

With all respect to such of our elders as may be present, great generalizations, 1600 page syntheses, do not spring fully formed *ab novo* from the minds of men fifty or sixty or seventy years of age. They are produced by these men out of long years of experience and data gathering.

And then, finally (4), we can see in Edmund Reitter the last phase of the normal scientific career. The field has been determined, the attitude has been struck, the synthesis—such as it is—is in. The mind is unwilling to desert the forms of its youth. It continues to play with the old ideas, to refine, to polish, to work out the implications, the difficulties, the imperfections of the preceding synthesis.

Let us now turn to other and better known examples of normal scientific careers.

It is with some hesitation that I mention the name of the founder of modern zoology, Carolus Linnaeus. We have it on the word of botanists that Linnaeus was such an incomparably better botanist than he was zoologist that his zoological attainments are scarcely worthy of notice. To consider Linnaeus as a zoologist, then, is to consider only a fragment of his career. With this understanding, I proceed with my account.

He was born in 1707 in Sweden. We find him devoting himself early to a study of the classification of plants and animals. Aristotle, Wotton, Gesner, Aldrovandus, Ray—these were the principal authors over whom he seems to have pondered. Nor did he fail to make observations of his own.

By his twenty-eighth year he seems to have made up his mind, and we find him publishing, under the title of *Systema Naturae*, a detailed synopsis of the plant and animal kingdoms. In this work, which consisted of only a few newspaper size pages, Linnaeus defined the several classes, orders, and genera of the plant and animal kingdoms in short, clear cut fashion. Illustrative species of each genus were listed but no species were described. And this was done and published while Linnaeus was sojourning in the Netherlands.

Upon his return to Sweden, Linnaeus embarked on a detailed survey of the fauna and flora of Sweden, publishing diagnoses of undescribed species of plants and animals. On the zoological side, this culminated in the publication in 1748—when Linnaeus was 41 years old—of the *Fauna Suecica*—a descriptive catalogue of the entire fauna of Sweden as known to Linnaeus. This was a more detailed survey of a local fauna, detailing more species, than had ever been done before. For example, over 300 species of beetles were therein set forth.

Out of this background—itself no mean achievement—came the nomenclatorial innovation—the binomial nomenclature—for which Linnaeus is so justly famous. This innovation arose because Linnaeus found himself up against a more extensive series of specific units than had any previous investigator, so that the current use of a twelve word specific title for each species became cumbersome and impossible.

Moreover, the local Swedish survey inspired Linnaeus to attempt bigger and better things. So that we find the fifth decade of Linnaeus' life devoted to the application of a binomial nomenclature to descriptive catalogues of the plants and animals of the entire world.

1753 saw publication of the work on plants. 1758 saw the work on animals—some 4000 species—from which modern nomenclature dates.

The last two decades of Linnaeus' life (he died in 1778) found him the center of an enthusiastic and admiring group of students. And the master—not at all to his distaste—found himself looked up to, even in his own life time, as the father of natural history.

We, to-day, of course, look upon the life-work of Linnaeus as a marvelous and auspicious beginning, but scarcely more. What are the 4000 species of animals recognized by Linnaeus compared with the five or six hundred thousand species with which our catalogues are now cluttered, or with the millions of species which our more enthusiastic systematists estimate to be in existence?

But it is to view this or any life work out of its perspective to view it as merely the propedeutic to something else. The days of a man's life are a priceless gift, the incomprehensible mystery of his being. And the use to which he puts this gift must be judged as a thing apart and complete. A man is born, he achieves, he departs. He is not primarily a cog in a wheel, even though that wheel represent the onrush of modern science.

And especially is this so in the case of Linnaeus. Recall the mighty age in which he lived. Berkeley and Hume and Kant were working the

greatest revolution in philosophy since the days of Aristotle. Diderot and the French *Encyclopaedia*, Voltaire and Rousseau were preaching the cause of Rationalism in France. Edward Gibbon was about to relate, with new insight, the history of "the rise of barbarism and Christianity." Thomas Jefferson was declaring "that all men are created equal," and his compatriots were conducting a war to prove it. "Liberty, Fraternity, Equality" would soon be the watch-words of the French Revolution.

The work of Linnaeus represented the application of the rationalistic spirit of the age to the problem of the classification of living things. And Linnaeus and his followers undoubtedly believed that they were producing a somewhere nearly complete catalogue of animals and plants.

I have one more example of a normal scientific career that I should like to cite before passing on to a consideration of careers of other types.

Charles Darwin was born in Shrewsbury, England, in 1809, the son and grandson of physicians. His father was a man of means, so that Charles early gained the impression,—that could not be gainsaid,—that he would never have to work for a living. As a youth he drifted and at one time his father expressed the fear that his son would develop into nothing more than an idle country gentleman.

For three years, between the ages of sixteen and nineteen, he studied medicine at Edinburgh and then withdrew without finishing the course. For three more years, from nineteen to twenty-two, he studied theology at Cambridge, with an equally unsatisfactory result, though he did obtain a degree from the latter institution. It was not until late in 1831 that he was fairly started on a career when he secured the appointment to—and the consent of his family to accept—the position of naturalist on H. M. S. Beagle, which was being sent out by the British navy on a five years surveying voyage around the world.

It is an important point. Let parents and educators take notice. The early twenties are entirely soon enough for the commencement of a scientific career, provided only that the previous training has been sound. There is no need for that early specialization, which is sometimes so interesting and so spectacular in students or in children. There is no essential cause for concern for the youth, who, for a time, appears to drift. Darwin drifted—first into medicine—then from medicine into theology—from theology into natural history. Not that we become Darwins by drifting, but one does not need to be an infant prodigy! And remember this, once Darwin started he drifted no longer.

Late in 1836, age 27, Darwin landed from the Beagle. Within three years he had married, had opened his notebook on species, and had settled down to his life-long contention with ill-health.

Witness now the care with which he assembled the data for his attack on the problem of species. On the one hand he decided that he must know species at first hand. Accordingly he embarked on a decade-long study (1846-1856; age 37-47) of the Cirripedia or barnacles and produced a series of volumes which are still considered the basic work on this group of animals. How many of our modern evolutionists have had the temerity to do likewise?

An incident attaches itself to these barnacle years that is of interest as exhibiting the atmosphere of the Darwin home. The Darwins lived in the village of Down, about fifteen miles southeast of London Bridge. They had a large family of children "to whom it appeared that barnacles were part of the ordinary routine of any normal family. One of them, hearing of a neighbor who was sometimes idle in the forenoon, inquired, 'But when does Mr. Blank do his barnacles?' " (Ward, Charles Darwin 1927, p. 256.) Barnacles loomed large on the horizon of the Darwin family.

Which reminds me of an occurrence in my own family two or three years back. We had been going on numerous trips and picnics with some friends in the Department of Fisheries at the University and the collecting of fishes and beetles occupied an important place. Came a Sunday when we arranged a picnic with some friends in the English Department. The young son, aged four and one-half, was discussing the situation with his mother. "What does he collect, mother? Doesn't he collect anything? Doesn't he collect fish? Doesn't he collect beetles? Doesn't he collect anything?" The situation was incredible!

But to return to Darwin and his preparations. In addition to an intimate knowledge of species, Darwin realized that a proper study of variation and heredity was necessary to an understanding of species. Forthwith, he took up the breeding of pigeons and did not hesitate to become personally acquainted with pigeon fanciers far and wide. If he was not as fortunate as Mendel in the selection of his material, at least he put the results he did obtain to the best of use.

And then, thus equipped, in his fiftieth year he wrote his *magnum opus*—*The Origin of Species*, published in November, 1859.

And then what did Darwin do with the two decades or better that remained to him, for he died in 1882 at the age of 73 years.

Something of Darwin's insight into the nature of the problem can be seen by listing some of the things he did not do.

He might, for instance, as did Huxley in England and Haeckel in Germany, have given himself over to combatting the anti-evolutionary utterances of the ignorant and the perverse.

Or he might, as did these same men, have sought the details of human evolution.

Again, he might, as did Gegenbaur, E. Ray Lankester, and a host of others, have followed out the new developments in comparative anatomy and comparative embryology.

But Darwin's appreciation of the difficulties confronting the idea of evolution was far too keen to permit him to run off on any of these side issues. The facts adduced and referred to in the *Origin of Species* had convinced him of the essential truth of evolution. Anthropology, morphology, embryology, even, at last, theology would eventually have to give way before it. So that Darwin turned aside from these hurdles that so fully occupied nearly all the other evolutionists of his period, and, fully a generation ahead of his time, confined himself to the end of his life practically exclusively with a study of adaptation, variation, and heredity.

The *Fertilization of Orchids* (1862) dealt with some of the most perfect and curious adaptations in the whole realm of natural history—the close morphological relationship between the orchid flowers and certain insects to accomplish the fertilization of the flower.

The Variation of Animals and Plants under Domestication (1868), besides the subject matter indicated in the title, set forth under the name of pangenesis Darwin's provisional hypothesis to account for heredity.

The Descent of Man (1871) is essentially a study of secondary sexual characters undertaken in the hope of accounting for the differences between the races of man, which Darwin had come to believe could not be accounted for by ordinary Natural Selection.

The Expression of the Emotions in Man and in Animals (1872) dealt with other features that did not seem to be adaptive.

And the problems involved in *Climbing Plants* and *Insectivorous Plants* (1875) and *The Power of Movement in Plants* (1880) are obvious.

The problem, as we know, proved too much for Darwin and his technique. Had he known of Mendel's paper—but he did not—he might well have been spared pangenesis.

In extenuation of Darwin, we might well recall that, whereas one of his major problems, the transmission of variations from one generation

to the next, has been solved, the other problem, that of the *origin* of variations, is still almost completely unsolved. Perhaps Darwin would have preferred to fail in a great cause than to succeed in a minor one.

These three men, then, Reitter, Linnaeus, Darwin, will serve to exemplify the normal scientific career.

Before passing on to the other types of careers, I shall direct a word to the normal or apparently normal career that is prematurely terminated by death. The history of science must be full of such instances: able men who, due to an untimely demise, never got beyond the data-gathering stage. Two such I shall cite from the annals of American entomology.

The first is the "father of American entomology", Thomas Say. Say's entomology had one very serious handicap to contend with, namely his enthusiasm for communism! This enthusiasm led to his removal from Philadelphia,—then the center of American science,—to New Harmony, Indiana, early in 1826, when Say was 39 years of age. There he died, eight years later, in 1834, aged only 47 years.

To begin with, a frontier town is no place for a scientist. Scientists and scientific work are essentially a product of great centers of population, and nothing seems to correlate so closely with a map plotting the distribution of scientists than a second map showing the percentage of the population engaged in manufacturing, which is to say, the degree of industrialization.

Despite this, however, Say's entomological work in Indiana gave no sign of approaching a standstill. I have the feeling that, had his life been prolonged another two or three decades, a series of entomological monographs would have come from Say's hand that would have put the science of entomology twenty or thirty years ahead of where it was. The papers on Coleoptera, for instance, that the younger Leconte published in the fifties and sixties might well have been the handiwork of Thomas Say.

As it was, Say's work was practically exclusively confined to descriptions of new species, and it is possible, of course, that he would continue in that way to the end.

The second man I want to cite is less known. George Robert Crotch was born in England in 1842. At the age of 21 he published a catalogue of British Coleoptera. He collected in the Canary Islands in 1864 and in Spain in 1865 and in 1870 and became an authority of Coccinellidae and Erotylidae. In 1872 he left England with the intention of making an entomological tour of the world. He spent the winter at Philadelphia, producing an important series of papers on American Buprestidae,

Erotylidae, Endomychidae, Coccinellidae, Dytiscidae, Chrysomelidae, and a check list of the Coleoptera of America north of Mexico! The summer of 1873 was spent on the Pacific Coast collecting beetles. Croteh returned to Philadelphia that fall with the intention of proceeding to Cambridge and becoming curator of insects at the Museum of Comparative Zoology at Harvard. But tuberculosis, contracted thru exposure in the west, laid him low, and he died the following June, aged 32.

There cannot be the least doubt that, had Croteh lived, he would have become one of our outstanding coleopterists.

It is now desirable to consider what I term the precocious type of scientific career. I refer here to the individual who, as a young man, climbs to heights of eminence, and then does little or nothing more the rest of his life. Examples are not difficult to find, despite the fact that I do not believe a very great part of the scientific work of the world is done by such men.

First I cite the Irish Bishop, George Berkeley, who, at the age of twenty-five—in 1710—published his essay on the *Principles of Human Knowledge*, which initiated a revolution in philosophy, and then, throughout the next forty-three years, he died in 1753 at the age of 68, did little of lasting importance.

There is the case of Andreas Vesalius, who, at the age of twenty-nine—in 1543—published the first modern work on biology, the *De humani corporis fabrica* (*Concerning the structure of the human body*). And then he did nothing more. The opposition of the Church played a part in this, however. For instance, Vesalius had failed to prove that man had one less rib on one side than on the other! casting discredit on the creation of Eve from Adam's rib!

Then there is Isaac Newton. At the age of twenty-four—in 1666—he formulated the theory of gravitation, finally publishing it and much else in the *Principia* twenty years later. During the last thirty-three years of his life—1694-1727, age 52-85—Newton was director of the mint in London and occupied himself in important measure with theology.

The great French physiologist, Claude Bernard, may almost be cited as another example of this type career. His important discoveries, which concerned the pancreatic juice, the glycogen of the liver, and the functioning of the sympathetic nervous system, were made by 1860, his forty-seventh year. Whereupon for his remaining 18 years—he died in 1878 at the age of 65—he lived and lectured in the sunshine of his fame.

I do not mean, of course,—that is, if I could!—to cast an aspersions on the names of these and others to whom achievement came early, for not following up the great results of their earlier years.

Perhaps we are really in the presence here of a super-genius or an unusually fortunate combination of circumstances due to which the individual is able to compress into a few years the ordinary experiences of a life-time.

Was Alexander to blame that at the age of thirty-one he found no more worlds to conquer?

Perhaps, when the human mind has done its stunt, things are over! Is Isaac Newton at theology so much worse than Charles Darwin at pangenesis? But the comparison is hardly fair.

There remains to consider the third category, namely that type of scientific career in which the contribution is incidental in a life primarily concerned with other things. I do not have many examples to cite of this sort of career. You may be able to think of cases for yourself. But, in general, great discoveries and important contributions are not made in this way.

There is, however, one outstanding exception to this, one of the most interesting lives in the history of biology. I refer to Gregor Mendel. It was only last year that the details of Mendel's life have become available in English as the result of a translation of a biography that was first published in German in 1924.

Gregor Mendel was born in Moravia in 1824 of peasant parents. His hard struggle for an education led him in 1843, at the age of 21, to enter the Augustinian Monastery of St. Thomas at Brunn. The Augustinians are groups of clerics who take up a religious not primarily for its own sake but to enable them to be of service, as parish priests or as teachers. Though they individually took the oath of poverty, they did not, as a group, object to the garnering in of worldly goods. And in 1875 Mendel estimated the wealth of the group at about \$360,000.

Intellectual interests loomed largely at the monastery at the time of Mendel's entry. The abbot, Cyrill Franz Napp, was an orientalist. Among the other monks were a botanist, a musician and composer, a linguist, a theologian, a student of Goethe. Aurelius Thales, a notable botanist, had just died. And Franz Matthaeus Klacel, philosopher and journalist, in 1844 was deprived of a professorship by the bishop for spreading the Hegelian philosophy and Hegelian ideas. So that Mendel, far from removing himself from outside influences, secured a place in

"one of the chief centers of the spiritual and intellectual life of the country."

What was Mendel's religion? We don't know. In science and in politics, both clerical and lay, he was liberal. His religious convictions were either so profound as to be completely taken for granted or he buried his doubts so deeply as to forget them.

The decade following his entry to the monastery was spent in study. He was confirmed as a priest in 1847, age 23, but two months in a parish convinced both him and his superiors that he was not fitted for that. His biographer tells us that Mendel was too much affected personally by the misfortunes of his parisoners.

So he turned to teaching, apparently with no better success, at least in the beginning. In 1850, age 27, he failed to pass examinations for a teaching certificate! But his prelate seems to have had faith in him, and we find him being sent for two years (1851-53; age 28-30) to the University of Vienna.

Finally, in 1854, age 30, Mendel secured a temporary position as teacher of physics and natural history in the Brunn Modern School, and he settled down to the fourteen happiest years of his life. In 1856 he made a second try for that teaching certificate and again failed! But he got on with his boys, so that his position became, as it were, permanently temporary!

And so it came about that Mendel came to plant breeding. Prelate Napp assigned him a strip of garden twenty feet wide and one hundred and twenty feet long. Here, between 1856 and 1863 (age 32-39) the famous experiments on the pea were performed. In 1862 Mendel joined with other young men to form the *Naturforschenden Vereins in Brunn*—The Natural Science Society of Brunn—and in the *Verhandlungen* of this society for 1866, volume IV, his famous paper was published.

He secured forty separata of his paper—it would be interesting to know how many of these still survive. He did not send one of them to Darwin, the one man who might have appreciated it—though he purchased and read all of Darwin's books as they came out.

Following this, Mendel experimented on a long series of other plants, on none of which did he publish with a single exception. Some of these (four-o'clock and maize, for example) he found to confirm the results obtained on *Pisum*. In so many instances, however, did he find divergence that eventually he came to hold "that the laws he had discovered in the case of the edible pea were not universally valid." The *coupe de grace* to his theory was given by his extensive experiments on hybridization in

Hieracium or Hawkweed. It was not until thirty years later that it was discovered that a large percentage of the seeds of these plants, especially in hybrids, develop parthenogenetically—enough to ruin any breeding experiment. Darwin was not alone in groping in the dark!

And then, in 1868, Mendel was elected abbot of the monastery. He had to give up his teaching. Now, at last, he would have the run of the whole cloister garden! But, like research men before and since, the duties of administration took their heavy toll, and, after 1871, no more plant breeding was done.

He lived another decade, continuing his general interest in scientific matters and certain of his scientific observations, as the gathering of meteorological data, until within a few weeks of the end. He died January 6, 1884, age 63 years. His personal papers were burned. His published papers were forgotten.

“A huge concourse of mourners attended the funeral train . . . representatives of governmental authority . . . professors, teachers, members of the Catholic clergy . . . the Protestant pastor . . . the Jewish rabbi, representatives of . . . numerous societies, deputies from the Heinzendorf fire brigade (his native town), . . . many . . . poor, to whom he had always been so kindly and helpful . . .

“But, though hundreds realized that they had lost a good friend, and hundreds more came as in duty bound or . . . to witness the interment of a dignitary,” not one realized that he was at the funeral of a great man!

One might include Mendel's career with that of Isaac Newton and others as belonging to the precocious type, were there any evidence that he had ever given any thought to plant breeding before the age of 32 or publishing before the age of 42. Mendel's case is really one of a man, primarily occupied with other matters, in the course of little more than a decade, making a fundamental discovery which he formulated with the greatest possible clearness, but the vital implications of his discovery he failed to grasp.

And this is, probably, the real reason why Mendel's work went unknown, not the obscureness of the publication—it was a satisfactory vehicle for Edmund Reitter only four years later. For if a man fails to recognize his own off spring, what hope is there that anybody else will do so?

We have been traversing, and I trust not too irreverently, the central sanctuary of the human spirit. For nothing is more sacred than the use to which a man puts the only existence that is vouchsafed to him!

We have been speaking of great things: of life, of success, of inevitable death.

I started with the truism that the history of science is made up of the achievements of the individual scientists and that one approach is through the proper understanding of the nature of these individual achievements. I do not claim to have been fully or even partially successful in setting forth the nature of the individual achievement, or even to have fully formulated the problem. All that I can at most expect is that you have caught some little glimmering of the nature of the problems involved.

I have tried to depict for you the scientist leading his ordinary normal career—even one which you and I may hope to emulate.

I have tried to show you some of the outstanding characteristics of this career and some of the variations to which it is subject.

I have attempted to suggest the ebb and flow of mental energy that may lie at the bottom of any life highly dependent on stimuli from within, such as the life of the scientist, the artist, the political or military leader.

I have attempted to uphold the significance of a man's career for its own sake—as a completed artistic whole—not as a link in the supposed advance of science. It is only such that I can see meaning to it. The individual scientist, active, functioning, bringing nature under the dominance of his understanding—this I appreciate. But the onward march of science—to this I am cold.

Newton, Darwin, Edmund Reitter—the careers of these men through their achievements have or may become integral parts of your life and mine. The things that we can do are greater because of them. But, while their careers have a place in ours, our careers have no place in theirs.

The onward march of science has no more meaning than has any other intricate natural phenomenon. The career of the individual scientist has all the meaning that has your life or mine.

Nothing—of meaning—to the race, everything to the individual! I would make a very poor German or Italian or Russian, as I understand the current political philosophies of those nations! For nothing is more certain than that the age will come when the earth will be a dead planet and the race of man extinct. Then what of our racial destiny? But still unabated will be the significance of the single life fully lived.

I see three scientists working side by side in the same laboratory: one an old man still traversing the once-fruitful paths of former years,

one a man in the heyday of his intellectual achievement, one at the very beginning of his scientific quest. Conventionally, but foolishly, we congratulate the young man on his youth, on the fact that his career is yet before him. And the young man may be killed to-morrow, and where is his career then? Or, and again foolishly, we chide the maturer men because they are, as we say, set in their ways. We might better rejoice with the old man that time has been granted for the greater completion of his life's handiwork, though even this would be unwise. Rather each alike is fortunate in that he has that wherewith, in the light of his own experience, he may come to an increasing understanding of his world.

OF STUDIES

Studies serve for delight, for ornament, and for ability. Their chief use for delight, is in privateness and retiring: for ornament, is in discourse; and for ability, is in the judgment and disposition of business; for expert men can execute, and perhaps judge of particulars, one by one: but the general counsels, and the plots and marshalling of affairs come best from those that are learned. To spend too much time in studies, is sloth: to use them too much for ornament, is affectation; to make judgment wholly by their rules, is the humor of a scholar: they perfect nature, and are perfected by experience: for natural abilities are like natural plants, that need pruning by study; and studies themselves do give forth directions too much at large, except they be bounded in by experience. Crafty men condemn studies, simple men admire them, and wise men use them; for they teach not their own use; but that is a wisdom; without them and above them, won by observation. Read not to contradict and confute, nor to believe and take for granted, nor to find talk and discourse, but to weigh and consider. Some books are to be tasted, others to be swallowed, and some few to be chewed and digested; that is, some books are to be read only in parts; others to be read but not curiously; and some few to be read wholly, and with diligence and attention. Some books also may be read by deputy, and extracts made of them by others; but that would be only in the less important arguments and the meaner sort of books; else distilled books are, like common distilled waters, flashy things.

—*Excerpt from Bacon's Essays.*

OF GENERAL INTEREST

The Installation of the Alpha Mu Chapter

THE Alpha Mu Chapter of the Phi Sigma Society was installed at Corvallis, Oregon on November 18, 1933. The exercises were held at 4 P. M. in the Memorial Union building on the campus of the Oregon State College. Dr. Melville H. Hatch (Beta), National Vice-Chancellor and Assistant Professor of Zoology at the University of Washington, was the installing officer. He was assisted by Dr. Ralph Huestis (Mu), Professor of Zoology at the University of Oregon, Sponsor for the new chapter; by Dr. Rosalind Wulzen (Mu), Assistant Professor of Zoology at the University of Oregon, Acting Vice-President; by Mr. George F. Waldo (Theta) of the United States Bureau of Plant Industry, Acting Secretary; and by Miss Elizabeth Barto (Lambda), Acting Treasurer.

The new chapter has its headquarters at the Oregon State College, but includes members from the University of Oregon at Eugene and the University of Oregon Medical School at Portland.

The following persons were initiated as charter members of Alpha Mu Chapter at the time of the installation:

Honorary member: Professor L. F. Henderson.

Faculty members: Professor H. P. Barss, Dr. Nathan Fasten, Dr. Earl L. Packard, Dr. H. B. Yocom.

Active members: Eldon Ball, James Bishop, Margaret Boone, James Brooke, Paul Campbell, Robert Coen, Jane Cook, Roland Dimick, Miles Drake, Catherine Dunlop, Theodora Gustafson, Mrs. L. F. Henderson, Irvin Hill, Ruth Holt, Maurice Kerr, Noal Larsen, Dale Leslie, Margaret Litscher, Marguerite Loretz, Walter Lund, John Merriitt, Virginia Patterson, Donald Prentiss, James Roaf, Nan Ruonala, Dr. Ethel Sanborn, Phillip Staats, Miriam Stafford, Siegfried von Berthelsdorf, Edward Wall, M. Elaine Williams.

A number of additional charter members were unable to be present at the installation, but it is expected that they will be initiated into the society at an early date.

Following the initiation of charter members, chapter officers were elected and installed: M. Elaine Williams, President; Noal Larson, Vice-President; James Roaf, Secretary; and James Bishop, Treasurer.

The installing officer then declared the new chapter installed and read messages of greeting and congratulation from Dr. A. I. Ortensburger, National Secretary, from Dr. Anselm Keefe, Editor of the *Biologist*, and from the following chapters: Beta, Delta, Theta, Iota, Nu, Pi, Tau, Chi, Alpha Beta, Alpha Delta, Alpha Eta, Alpha Iota, Alpha Kappa, Alpha Lambda. Mr. John Roberts, President of Psi Chapter and present as a delegate from that group, extended greeting on behalf of his chapter. Other Phi Sigma members present to welcome the new chapter were Dr. D. C. Mote (Alpha), Dr. P. W. Miller (Zeta), Mr. E. W. Britt (Tau), Mr. T. P. Dykstra (Zeta), Miss Goldie Bell (Psi).

President Elaine Williams then took the chair and the following active members were elected and initiated into the chapter: Mrs. Maple Beals, Robert Brown, Elmer Hanson, Howard Johnson, Loris C. Oglesby, James Mielke, Ewald Rohrmann, Joe Schuh, Rich Warrington, David Wiley.

Mr. Rich Warrington was then elected and installed as treasurer in place of Mr. James Bishop, resigned. The meeting adjourned.

An Installation Banquet was held at 6:30 P. M. in another room of the same building. Dr. Ralph Huestis, as toastmaster, called upon Dr. Melville H. Hatch for a few words on "Phi Sigma—Aims and Ideals." Response on behalf of the chapter was made by Mr. Dale Leslie and on behalf of the Administration and the School of Science by Dr. Earl L. Packard, Dean of the School of Science. Dr. Hatch, thereupon, gave an address on "The Role of the Individual in the History of Science."

The Installing Officer takes the present opportunity to thank the officers and members of the Alpha Mu Chapter for the courtesy and cordiality with which they received him and to congratulate them on the possession of an enthusiastic and most ably managed organization.

MELVILLE H. HATCH,
Installing Officer.

ADDRESS

on the Installation of the Alpha Mu Chapter at Corvallis, Oregon November 18, 1933

ON March 17, 1915 a group of eleven young men interested in biology at Ohio State University constituted themselves the Alpha Chapter of what they termed the Phi Sigma Honorary Biological Society. On June 3 of the following year a similar group of young men at the University of Michigan were admitted as Beta Chapter of the society. Four more chapters were added in 1917. The War interfered with the addition of further chapters until 1921, when five additional chapters were installed, making a total of eleven chapters. The next four years saw the addition of six more chapters, bringing the total to 17. The end of 1930 saw 32 chapters (3 inactive).

This afternoon I have had the honor and the pleasure of installing the present group as the Alpha Mu Chapter of the Phi Sigma Society, the thirty-sixth charter to be issued by the organization (4 inactive).

And we still continue to grow. The mail within the last week or so has brought me word that two collegiate groups at the present time are making enquiries concerning the organization.

Phi Sigma, as a group, occupies a middle ground between the highly specialized departmental club or seminar and the more general group that is represented by Sigma Xi. Phi Sigma is a recognition of the vital unity of all biology and of the fact that the various divisions of the life-sciences are highly arbitrary and artificial, set up for convenience and in order to enable us to handle the more easily a complicated field.

The thriving of Phi Sigma is evidence that our younger biologists, our beginners in zoology, botany, entomology, and so on, appreciate the benefit to be derived from an association with workers in other biological fields than their own.

Phi Sigma has always been a liberal progressive group, never allowing itself to become entangled in traditions either of its own or of others making. The frequency with which it has revised its constitution is eloquent testimony to this fact. Moreover, under the constitution, a large amount of leeway is allowed the individual chapters.

If I may be allowed a word of suggestion, a new chapter such as yours could do nothing better than to appoint a committee to make a careful and critical study of our constitution to determine precisely what is prescribed thereby and what is left to your own discretion. Having done this, you might then find it desirable to codify your local practices in a set of by-laws. The necessity for this may not, at first be apparent. If you stop to reflect, however, you will understand that a group of traditions perfectly well known to you and your present group of officers may be quite strange to the groups that will someday take your place. A properly written instrument, always capable of revision, will furnish a sure thread of continuity that may otherwise be lacking.

If Phi Sigma has continued to stand for any one thing that has been youth. Sigma Xi, in every institution with which I have been connected, has always been run by the faculty,—and usually by the older and more conservative branch of the faculty at that. Phi Sigma from the beginning has placed the active control of the chapters in the students' hands, and, until a recent revision of the constitution, made it impossible for other classes of members, including faculty and alumni members, to vote. Recent revisions have modified these restrictions in certain respects.

I remember that, for several years, at the Beta Chapter at the University of Michigan and at the Psi Chapter at the University of Washington, the greatest of conservatism was exhibited in the election of faculty members. Eventually the temptation to keep electing proved too great and all were included, but the heads of the zoology and botany departments at Washington were the last faculty members in respective departments to be invited to join, and the feeling has been persistent that Phi Sigma was for beginners.

The problem of the status of alumni members has so far held itself in abeyance, chiefly because of the youth of our organization. A faculty member is just that. But an alumni member once had an active hand in the control of a chapter. Will these members continue to be willing to relinquish control as they find their student days are over? Or will Phi Sigma find itself growing up? The answer to these questions lies with the future.

Chapters of Phi Sigma vary. The New Hampshire chapter is entirely undergraduate. The Illinois and, I believe, the Wisconsin chapters are entirely graduate. For many years the Michigan chapter declined to admit women. The Washington chapter will not elect to membership students who have not actually started on some research problem. The Hunter College chapter, at one time at any rate, confined its members to

alumnae of Hunter College, most of them no longer students at that institution.

The election of new members is a most important matter. The constitution requires at least a 90% affirmative vote to elect. Some chapters, such as Michigan, make a unanimous vote necessary.

The power which you, as active members, hold over the elections is a vital one, to be exercised with discretion, yet with determination. Remember that Phi Sigma is an academic organization and that interest and ability in science, especially in research, are the prime prerequisites for membership. If you dislike a person strongly, beware, check the sources of your dislike, talk the matter over with your fellow members of varying shades of opinion. You might just possibly be prejudiced! Perhaps you don't like the way the candidate greets you in the corridor. Perhaps the candidate does not stand in sufficient awe of *your* importance or *your* scientific or social attainments! Be sure.

And if you are a friend of the candidates, check yourself even more carefully. A rejected candidate can be elected at a subsequent meeting. An elected candidate is in for good. Is the candidate merely a good fellow, merely a pleasing personality? Is he by any chance a fraternity brother? Is his interest in scientific matters more than a superficial one? Does it really go somewhere near the mainspring of his nature? Be sure.

And then vote courageously.

I am, I suppose, expected by tradition to exhort you to a diligent pursuit of research, to a persistent loyalty to Phi Sigma.

I decline to accede to either of these precedents.

If the fascination of research does not grip and hold you of its own accord, nothing that I can say will help.

And, as for Phi Sigma, you will get out of it what you put in.

THE EDITOR'S REPORT

By DR. ANSELM M. KEEFE *at the Chicago Convention*

AT the last convention in Cleveland the then Vice-Chancellor refused to stand for reelection at the end of his four year term in that office. As a result he was rewarded with the position he now more or less dubiously decorates,—the Editorship of the *Biologist*. Since that time seven issues of our magazine have been published. From what he has accomplished

during these three years and a half your Editor may either learn from his past mistakes, or cling to some hopes for the future. Either consideration should prove fruitful. May your Editor, therefore, take a little of this Convention's time to tell you what he has been trying to do with the *Biologist*?

Lacking a sufficiently wide distribution as well as recognition by the abstracting agencies, the *Biologist* can by no stretch of the imagination be called a scientific periodical. Years ago the National Council gave up the expensive idea of trying to put our journal in the scientific group. The membership of Phi Sigma is so diverse in character that no one magazine could adequately service so many fields of biological thought and interest. However, it must not be assumed that the *Biologist* aims to be just another fraternity magazine. It is, as I conceive it, most closely comparable to a trade journal, more or less of a "firm" publication, or a "house" organ. In it are to appear such articles and such news as will serve to draw the members of Phi Sigma closer together, and to stimulate them to greater activity. Perhaps you may think this idealistic, —if so, have it your own way. If the *Biologist* became a torch to kindle the interests and ideals of our membership, we would, to put it mildly, be none the worse off.

No editor could carry out such a program unassisted. This is specially true of the *Biologist*. Without funds or secretarial assistance, it is virtually impossible to publish representative issues which fulfill this purpose as well as measure up to the standards of Phi Sigma, unless the Editor receives close cooperation from the Chapters and their officers.

Just how much Chapter cooperation *has* your Editor received in the past three and a half years? The following tabulation tells its own story:

Volume	Number	Date	Reports Submitted
XII	3	February, 1931	None
XII	4	May, 1931	None
XIII	1 & 2	Sept.-Dec. 1931	4
XIII	3	March, 1932	24
XIII	4	June, 1932	None
XIV	1	Sept.-Dec., 1932	17
XIV	2	March-May, 1933	20

A total of seven issues, and of 65 Chapter Reports.

During the time that these issues were being published Phi Sigma had an average of 30 active chapters. If each had been represented with

one report in every issue there might have been over two hundred instead of sixty-five. As it was, a call was sent out to Chapter Secretaries for each of the four issues in which reports were actually published. This should have produced one hundred and twenty, but only sixty-five were realized.

How the various chapters stand on a comparative basis, will best be understood when I tell you that there hasn't been a single chapter which had its report in all four issues. So, in this regard none had a one hundred percent performance. There is some editorial consolation in the fact that about half of the active chapters are in the seventy-five per cent class with three reports in the four issues. These chapters were, as might have been expected from their general activity record: Beta, Delta, Zeta, Nu, Xi, Omega, Alpha Alpha, Alpha Epsilon, Alpha Zeta, Alpha Eta, Alpha Iota, Alpha Kappa, Alpha Lambda.

The rest of the chapters,—with one exception,—had two reports in the four issues, a fifty per cent cooperation. The solitary exception is Rho Chapter, which, in spite of the effusive promises of its President in the March, 1932, issue, has not seen fit thus far to recognize the existence of the *Biologist*.

What the future holds for the Phi Sigma journal remains to be seen. The Editor here acknowledges the invaluable and constant assistance of present and past national Council officers, as well as that of those considerate souls in the various Chapters who have lightened his editorial burdens. Nor can we ever forget the splendid services of a gentleman and printer in far off Denver to whom all credit for the attractive format of our magazine must go,—Mr. E. W. Milligan, of the W. H. Kistler Printing Company, printers of the *Biologist*.

At this point the Assistant Editor rises to express his appreciation of the commendation of the Editor-in-chief.

If it were not for such an interesting publication as "The Biologist" coming into the plant now and then, a printing office would become rather monotonous.

The Assistant Editor, compositors, pressmen, bindery department and especially the proof reader all enjoy working on this periodical.

—E.W.M.

Obituary

PHI SIGMA mourns the loss of one of its major lights in the death of Professor Andrew C. Life. He was the devoted husband of Cora Mae Life, last year's secretary of Alpha Alpha Chapter at the University of Southern California,—to whom goes all the sympathy of the entire society of Phi Sigma.

The following account is taken from the Los Angeles Times, September 9, 1933:

After an illness of several months, Andrew C. Life, for the last twenty-six years professor of botany at the University of Southern California, died last night at the Queen of the Angels Hospital. His home was at 2531 Sixth avenue.

Born in Grant county, Indiana, Prof. Life, who was 65 years of age, was educated at the University of Indiana, from which he received his bachelor's degree in 1896 and an M.A. in 1897, and then did graduate work at the University of Chicago and other institutions.

He began his teaching career as a high school instructor in Greensburg, Ind., and also taught in high school in Wichita, Kan., before his first collegiate post, which was professor of botany at Earlham College. Then he spent three years on the faculty of Washington University in St. Louis before he came to U. S. C. in 1907.

Prof. Life was the author of numerous books and articles in his special field, including "Conservation of Marine Algae" and "Germination of Fern Spores," and was a member of a large number of professional, scientific and fraternal organizations. Among these were Sigma Xi, Phi Sigma and Phi Delta Chi, all honorary scientific fraternities; the American Association for the Advancement of Science, National Geographic Society, Pacific Geographic Society, of which he was a founder; Botanical Society of America, Western Naturalists, American Museum of Natural History, Southern California Academy of Science, Sierra Club of Southern California, International Adventurers' Club, Masons and Phi Sigma Kappa.

He leaves his widow, Mrs. Cora Mae Life; two sisters, Mrs. O. D. Cartwright and Miss Catherine Life, both of Muskegee, Okla.; and three brothers, J. F. Life of Marion, Ind.; W. E. Life of Oneida, N. Y., and C. S. Life of this city. Another brother, Frank M. Life, was the head of the physics department of the University of Arizona until his death several months ago.

"Amateur Biologist"

In order to provide a forum for exchange of research results and interpretations, The American Amateur Biologist Society has been organized on a non-profit basis. Its director is R. J. Schwartzmiller and headquarters are at 401 East Michigan Avenue, Lansing, Michigan.

The first issue of the Association's Journal has been published, a mimeographed publication containing material of interest to the experimenting biologist. Further information may be obtained from the director, who advises us that a copy of the Journal may be had for fifteen cents.

From *Turtox News*, October, 1933. Vol. II, No. 10.

A Correction

Errata in March-May, 1933 "The Biologist" p. 70 "*Ethel* R. Force and Norman L. Schmerchel" should read "*Edith* R. Force and Norman L. Schmeichel".

A new 200-inch super-telescope, now being built by the California Institute of Technology in cooperation with Mt. Wilson astronomers, would bring the moon within an apparent range of about 24 miles, at which distance objects the size of a large building could be discerned. The new telescope will penetrate the heavens twice as far as the 100-inch—into regions man has never glimpsed. For its location beautiful Mt. Palomar, rather than Mt. Wilson, may be selected, since the proximity of electric lights in growing cities at the base of Mt. Wilson might interfere with long-exposure photography. But the accessibility of Mt. Wilson is one point in its favor as a site for the new telescope. The Observatory there, with a fine hotel at the end of a wonderfully scenic highway, is a great disseminator of astronomical information, visited by more than 20,000 persons a year.

—*Ransome Sutton in Los Angeles Times.*

EDITORIALS

ALPHA MU

WHEN the defection of chapter after chapter shows how other scholastic organizations are feeling the stress of the times, it is wholesome and reassuring to chronicle the reception of Alpha Mu of Oregon State into the ranks of Phi Sigma. Drawing its membership from two strong elements in a nationally known educational system, the new chapter bids fair to wear well and long. To Alpha Mu of Phi Sigma go our cordial good wishes for an enduring career as a potent agency in the stimulation of the research spirit among biologists both in and out of the immediate circle of college life.

Late Again!

No apologies are being offered for the lateness of the current double issue of the *Biologist*. In past years it was easy to obtain the addresses of Chapter Secretaries from our National Secretary. This year, however, for some unexplained cause the addresses came to the national office so slowly that the present list,—by the way, still incomplete,—was not compiled until late in the present month. This was bad enough. What preceded it was worse. The slim condition of Phi Sigma finances did not permit the issuance of two Fall numbers. They have had to be combined in this one. Nor does the National Treasurer yet know exactly how many copies of this very issue will be wanted by the Chapters. Not only has the work of the National Secretary and the National Treasurer been inexplicably slowed down, but so also has that of your Editor. Lacking the names of chapter secretaries, it has been impossible to solicit the usual Chapter News Letters. Thus the meager showing in this issue. However, let's do better next time!

Chicago Convention

The "salad" days of Phi Sigma are over. The 1933 convention in Chicago from June 26 to 28 was, in many respects the most unexciting and mature in the history of our national gatherings. Gone was the carping, the bickering and the criticism of other years; gone too the canvassing and caucussing; gone the sophomoric oratory. In their place there was an earnest desire for harmonious constructive development.

It was such a convention as National Officers of a decade ago would not have dreamed possible. As such it bodes well for the future of Phi Sigma. To that highly intelligent group of chapter delegates, consistently working through the hot June days in the narrow confines of Room 546 (who shall ever forget it?), goes the credit for the success of the 1933 national meeting. The scientific part of the program surprised the officers of the American Association for the Advancement of Science. Of all the organizations holding sessions in Chicago, credit must go to Phi Sigma for the longest and most varied program. That some of the papers, notably that of Mr. Wallace "made" the Chicago daily papers is not to be wondered at. Many a state academy of Science would have been proud to sponsor so diverse and interesting a program as that offered by Phi Sigma.

QUOTABLE QUOTES

Excrepts from The Golden Book

"A curved line is the loveliest distance between two points."

—MAE WEST:—*theatrical star and exponent of feminine curves.*

"There is less leisure now than in the Middle Ages, when one-third of the year consisted of holidays and festivals."

RALPH BORSODI:—*author of "This Ugly Civilization".*

"Feminine beauty, once the Creator's business, is now Big Business. American women spend well over two billion dollars a year on cosmetics."

—JEANETTE EATON:—*in "Harper's".*

"Old maids keep cats. Cats prey on mice. Mice eat bumble bees' nests. Bumble bees pollinate red clover blossoms. The more pollination the better the crop."

—DR. GEORGE MARSH HIGGINS:—*Mayo Foundation biologist, takes an afternoon off to prove that the more old maids in a district the more red clover.*

"I usually get my stuff from an awful lot of people—who promised somebody else that they would keep it a secret."

—WALTER WINCHELL:—*professional gossip, on the secret of his success.*

"If I were running the world I would have it rain only between 2 and 5 a. m. Anyone who was out then ought to get wet."

—WILLIAM LYON PHELPS

"I have no expectation of making a hit every time I come to bat."

—FRANKLIN D. ROOSEVELT:—*President of the United States.*

"If your morals make you dreary, depend upon it they are wrong."

—ROBERT LOUIS STEVENSON

CHAPTER NEWS LETTERS

Epsilon—University of Denver

Epsilon Chapter, University of Denver, maintained its activities throughout the summer session by two meetings, one on July 8th, and the other on July 14th. On the latter date, the first summer initiation service in the history of this chapter was held for eligible students who are doing graduate work in summer school. The initiates were: Nathan Kiven, Ben Krim, E. Rosecoe, and E. Hertel.

The initiation was held out of doors in picturesque Daniel's Park, unjustly famous for its rattle snakes, and justly infamous for its black widow spiders. A report on the recent national convention was made by the chapter delegate, Herbert Wallace.

The first meeting of the fall term was held on October 11th at the home of Dr. I. E. Cutler. Mr. Robert Niedrach of the Colorado State Museum gave an interesting illustrated lecture on Colorado birds and mammals.

The second meeting held on November 8th, was held in the Renaissance room of the new Mary Reed Library. Prospective pledges were guests of honor, and for their special benefit, the president, Mrs. Francis Becker, gave a short review of the history, and achievements of Phi Sigma as a national organization. Dr. Cutler reviewed the history of Epsilon chapter. Dr. A. E. Holch contributed a fine piano solo to the special program. Mr. Lewis Barry of the State Museum gave an excellent talk on the reptiles of Colorado, with preserved specimens to illustrate the making of a key for their classification.

Our third meeting will be held December 6th at which time Dr. Justus Ward will speak on Scientific Problems studied by the U. S. Biological Survey.

We hope to be able to send to you more news during the year.

CHARLOTTE DUMONT, *Secretary*.

Mu—University of California

Interesting speakers at the semi-monthly meetings of the Mu chapter of Phi Sigma are among the following:

Professor E. O. Essig of the Department of Entomology

Subject: Biological Control of Insects.

Miss Esther Perry of the Department of Soil Science
Subject: Soil Moisture Relations.

Professor Ralph W. Chaney, Department of Paleontology
Subject: Ancestors of Our Forests.

Professor Charles F. Shaw of Soil Technology
Subject: Being a Foreigner.

Professor Holmes, Department of Zoology
Subject: Biology Abroad.

Mr. Ray Gilmore showed slides and talked on the subject, "Cruising in Alaskan Waters".

Professor Brooks: "What is Biophysics?"

Professor Herms: "Entomology in Relation to Other Biological Sciences".

Dr. A. H. Miller: "Studies in Territory Habits of Birds".

Dr. David Weeks: "Under Japanese Fire".

Mr. Rodney Ellsworth: "Changes in California Plant and Animal Wild Life".

Dr. J. Force: "The Sabbatical Wanderings of a Sanitarian" pointing out the important role which plague and other epidemics have played in influencing the history and culture of Europe.

Dr. S. C. Brooks: "My Trip to Tahiti"—Talk and interesting exhibit of native Tahitian clothing pieces, corals, living and preserved specimens of plant life, etc.

Other events of importance:

"Miss Leonora Hohl, Department of Botany at the University of California has been appointed to a scholarship at the University of Michigan for the coming year, 1933-34, including a trip to Europe".

Action toward a more efficient method of proposing candidates for membership has been sought. Methods used: Society members in general turn in suggestions for new members; verified by Council and Faculty. Council and Nominating Committee also active in proposal of members.

ELSIE HOLSTRON, *Mu Chapter.*

Nu

On October 18, five men were initiated into Nu chapter. They are Richard Dalrymple, Maurice Lieber, William Lang, Hudson Fowler, and William Koenig. The whole chapter now numbers six men.

Nu chapter has embarked on the most promising program ever attempted in our local society. This program consists of (1) internal improvement and increased interest, (2) the securing of high grade speakers for our benefit, and (3) the publishing of a small scientific magazine under our auspices.

More original papers are demanded. Here, at W. & J. where there is little research work being done by the students, the tendency has been in former years to present papers wholly uninteresting and far beyond the scope of the student. Papers are to be made shorter, simpler, and there is to be no wholesale copying from scientific books. A group program has been arranged and every member has a part in this. Five minute speeches are prepared by the members on their section of the problem. After they are completed, there follows a general discussion of the topic. The whole plan follows the idea of the seminar. The group problem at this time is Experimental Morphology. Our faculty members are doing research work along this line, and consequently, they govern the discussion and clear up points on which there is doubt.

We plan to have more open meetings this year. We believe that Phi Sigma should take more interest in the biology students of the college, and we are arranging programs for their particular need and enjoyment. Mr. Dieter, our Zoology instructor, and Mr. Porter, the Botany professor are preparing talks to be given to an assembly of biology students in the near future. There will be discussions held after these talks. All these things are calculated to stimulate interest and scholarship among the men taking biology courses. Trips through the museum are being planned under the auspices of Phi Sigma. Each member will conduct his little group, lecturing to them on the various things of interest.

On December 6th, the first edition of our magazine will appear. It has been divided into departments, according to the biology courses given in the college. Each member of Phi Sigma has charge of one of these departments, and it is his job to see that there appear in the magazine articles of interest to the students taking the subject of which he has charge. Also, the magazine will contain material written by our faculty members, drawings, illustrations, and scientific humor. We firmly be-

lieve that a magazine has its place on our Campus, and that it will be received with interest and enthusiasm.

Several of our members have become interested in Micrography, and their results have been very good, being especially helpful to the students of Histology.

Of course, we cannot expect that all our projects will be successful, but "nothing attempted, nothing done", is the motto we have adopted this year, and we are doing our best to make Phi Sigma the guiding light in scientific circles here at Washington and Jefferson.

H. D. FOWLER.

Tau-Duke University

Professor A. S. Pearse of the Department of Zoology, Duke University, spent the summer teaching ecology and directing special problem work. He also conducted a seminar in which a number of interesting subjects were discussed.

Professor G. T. Hargitt continued his research on the germ cells of the cat.

Early in the summer Professors Pearse and Hargitt attended the meetings of the American Association for the Advancement of Science held in connection with the Century of Progress Exposition in Chicago. Professor Pearse presented a paper on a symposium program with Professor Krogh of Denmark, Professor Juday, Professor Birge, and others of this country.

Professor Bert Cunningham taught general zoology during the first summer session. In July he went to Cold Spring Harbor where he gave a series of lectures in endocrinology. He returned several weeks later to teach a course in the same subject at Duke University. He also spent some time at Beaufort, N. C. where he continued his experimental work on turtle embryology.

Professor F. G. Hall returned in September from Cambridge, England where he had been since February on leave of absence. He and Professor Joseph Barcroft carried on research on the blood of foetal goats and other animals. While in England Professor Hall was also associated with Dr. G. S. Adair. During his stay Professor Hall found time to visit Professor A. Krogh in Denmark and to travel in Ireland, Scotland, and France. Mrs. Hall spent several months in England with Professor Hall.

Professor D. L. Hopkins taught protozoology during the summer and carried on research on amoeba. Professor and Mrs. Hopkins are the proud parents of a son, Milton Lucien, born on September 30.

Professor I. E. Gray taught general zoology the first part of the summer. He spent the latter part at Woods Hole.

Dr. C. W. Hooker assisted in the teaching of general zoology. His Doctor's dissertation dealt with the male hormone. He was the recipient of a National Research Fellowship for the year 1933-'34 and is now in Rochester, N. Y. at the University of Rochester where he will work with Professor B. H. Willier.

Dr. S. R. Tipton received his doctorate this past June. The title of his dissertation was "Factors Affecting the Respiration of Vertebrate Red Blood Cells". He is carrying on research in the School of Medicine of the University of Rochester.

Mr. C. G. Bookhout assisted in the teaching of general zoology this summer and continued his research on germ cells. He attended the Phi Sigma meetings in Chicago early in the summer. While there he presented a paper on "Development of the Germ Cells After Birth in the Male Guinea Pig". He also presented papers on the research of Dr. Tipton and Mr. L. E. Anderson.

Miss Helen Butts spent the summer in research on amoeba and in vacationing with her parents in Rhode Island.

Mr. William Cornwell received the Master's degree this summer. At present he is engaged as an assistant in teaching histology in the School of Medicine of the University of Rochester.

Mr. Reinhard Harkema spent some time collecting parasites in the western part of North Carolina. During the remainder of the summer he visited with his parents in Michigan.

Mr. Kenneth Kates continued his research on termites for the greater part of the summer.

Mr. Paul Reddish spent the summer in research on amoeba.

Mr. N. E. Rice received the Master's degree in June. The remainder of the summer he spent in research on amoeba.

In the first meeting of Tau Chapter this year Mr. C. G. Bookhout was chosen president; Mr. Reinhard Harkema, vice-president; Mr. Kenneth Kates, secretary; and Miss Helen Butts, treasurer.

An interesting program for the coming year has been planned. An annual banquet will be held as usual. Several new members will be initiated at this time. The outlook for a successful year is promising.

Dr. H. L. Blomquist taught at Junaluska Summer School during

June and July. In August he made a trip through Wisconsin and North Dakota and returned through Chicago. At present he is preparing manuals of the ferns, liverworts, and grasses of North Carolina.

Mr. Lewis Anderson, secretary to Tau Chapter for 1932-33 and president-elect for 1933-34, received his M.A. degree in June. He spent part of the summer at Lake Junaluska making an extensive collection of bryophytes from western North Carolina. During August and September he worked with the mosses from the central and eastern part of the state that are in the Duke Herbarium. He has just recently received a fellowship at the Morris Arboretum where he will probably continue cytological work with the genus *Philadelphus*.

Mr. William Maughn of the Forestry Department has been very active in directing field work on the Duke Forest. He has also assisted in the direction of conservation work. Recently he completed a detailed map of the 5000 acre Duke Forest.

Dr. F. A. Wolf is on sabbatical leave this year. He is doing mycological research at Harvard. Last spring he did some extensive work on blue mold, a common tobacco disease.

Mr. H. F. Williams is back at Duke this year after having been at Columbia last year. At the present time he is working on the distribution of grasses.

Dr. Paul Kramer worked in the physiological laboratories this summer giving special attention to the absorption of water by dead root systems. He has recently published a paper on the same subject.

Miss Lora Lee Robertson is teaching at Rutherford College this year.

Mr. J. H. Byron taught at the University of Georgia this summer.

Dr. C. F. Korstian has been busy with the administrative affairs of the Duke Forest but has found time to do considerable collecting. He, along with Drs. Oosting and Blomquist have just returned from a collecting trip to Smith's Island where they procured materials for the dendrology class. Dr. Korstian has also done some research in forest ecology during the summer.

Mr. Frank F. Smith received his A.B. degree in June and took work at Junaluska Summer School this summer. He is now working towards his M.A. degree.

Dr. Ruth Addoms made a motor trip through the Yellowstone Park and into the Canadian Rockies this summer. She also prepared a laboratory manual to be used in General Botany.

Dr. H. S. Perry spent the summer at Cornell doing research in corn genetics.

THE BIOLOGIST COMMITTEE,

NOLAN E. RICE, *Zoology*

FRANK F. SMITH, *Botany*

Alpha Lambda—University of Utah

I do hope that this Alpha Lambda news letter will not be too late.

Alpha Lambda Chapter of Phi Sigma has again welcomed many of its members after a very eventful summer, yet a number of our members have left Salt Lake City to follow new pursuits. Elmer Berry is now at the University of Michigan where he is continuing his research work on snails, while Ira Telford, our past president, is now teaching in Northern Idaho. Very soon after graduation, where he was honored with the degree of Master of Arts, Ira and Thelma Shrives were married. Two of our members are studying in California; William Behle is at the Museum of Vertebrate Zoology at the University of California and Mr. W. W. Newby is at Stanford continuing his research work in Embryology.

During the summer many of our members scattered throughout the United States. Lowell Woodbury was with the Bureau of Fisheries of the United States in Yellowstone Park, Dr. Walter P. Cottam was in Milford, Utah doing desert research work, Mr. and Mrs. Wilton Ivie enjoyed a very complete trip through the Eastern and Southern States and Dr. Margaret Schell visited in Watsonville, California.

We are offering congratulations to Mr. and Mrs. (Florence Jones) B. Harold Mendenhall and Mr. and Mrs. (Elizabeth Ring) Gordon Spendlove who were married this summer. The Spendloves are in the middle West where Gordon is completing his last year in Medicine. Mrs. Mendenhall is working towards the degree of Master of Arts at the University of Utah and is still an active member in Phi Sigma.

We are pleased that Wilton Ivie has been given the rank of Instructor in the Department of Zoology at the University of Utah.

Among those who received a Bachelor's Degree at the June Commencement exercises are Allan Randall, Fenton Carbine, Lowell Woodbury and Ralph Hill.

October 6, 7, 8 found twenty members of Phi Sigma and their guests at the David Neff Cabin in the Smith-Morehouse Fork of Weber Canyon where they were the guests of Dr. Ralph V. Chamberlin. Three more

perfect days could not be asked for. The fact that there were no knives, forks or spoons in camp for the first fifteen hours proved to be no hindrance. Fried eggs and all found their way on pieces of paper plate. Baseball, hiking, golf, horseshoes, shooting, cards, dancing, eating, collecting, and a huge bonfire kept everyone happy. The members and their guests included Dr. Margaret Schell, Horace Telford, Horace Richards, Charles West, Ruth Kirkpatrick, Dorothy Vincent, Lois Foster, Marian Woodbury, Louise Nesbitt, Lowell Woodbury, Fenton Carbine, Jim Wilding, Silvia Burt, Steve Durrant, James Moffat, Bernice Moss, Owen Andrus, Dorothy Naylor, Bill Stanton, and Marcella Nebeker.

We have planned a series of interesting lectures for the winter months.

Gerald Peterson, Ruth Kirkpatrick, Fenton Carbine, and Marcella Nebeker, officers of Alpha Lambda Chapter, extend good wishes to all Phi Sigma Chapters.

MARCELLA NEBEKER,
Secretary Alpha Lambda Chapter.

Alpha Mu-Oregon State

Alpha Mu, Phi Sigma's youngest chapter, has had a "pre-natal" history of some length and interest. In the fall of 1920 Samara, an honor society for advanced women students in Botany, was organized at the University of Oregon at Eugene. Its aims were scholarship, observation, and research, and throughout the ensuing years it maintained its high standards and raised the ideal of research among women interested in botany.

In 1929 the members of Samara became interested in Phi Sigma and wrote to Dr. Ortenburger about petitioning. He advised them first to enlarge the scope of their organization; consequently, in December, 1931, Samara was officially disbanded, and Beta Lambda was organized, including in its membership both men and women of high standing from all biological departments. The new society had for its specific purpose affiliation with Phi Sigma, and the constitution, adopted early the following term, was patterned after that of the national organization.

In the spring of 1932, when Beta Lambda was only a few months old, a federal educational survey resulted in the re-organization, by the State Board of Higher Education, of the entire state system of higher education. The School of Science was established, with upper division

and graduate work at the State College at Corvallis, and lower division work at the University and the Normal schools. The Dean of the School of Science, whose headquarters are at Corvallis, has charge of the entire system.

Realizing the need for a nucleus of membership at Oregon State College Beta Lambda, in the spring of 1932, initiated six advanced students from that institution, so that when work was resumed in the fall the membership included students at Oregon State College, the University of Oregon, and several who had gone from the University to the University Medical School at Portland. The name of the society was changed to the Beta Lambda Society of the School of Science of the Oregon State System of Higher Education, with headquarters at the State College and active members at the University and at the Medical School.

The petition for a charter was submitted to the National Council of Phi Sigma in January, 1933, and was granted in May, too late for installation to be held before the end of the school year. Alpha Mu chapter was installed November 18, 1933, and her members are proud to be a part of the Society of Phi Sigma.

ELAINE WILLIAMS,
President of Alpha Mu

THE PERFECT COOK

The supreme cook of the world, when he arrives, will be one of French rearing, who then went and learned about pastries in Vienna or Copenhagen, and about appetizers in Scandinavia and about soups in Russia and about sausages in Germany and about antipasti in Italy; and after that came over to this country to let a Down East housewife school him in pies and show him what moral grandeur abides in baked beans; and a Virginia or a Maryland woman teach him what can be done with crabs and oysters and terrapin; and an old-fashioned Louisiana lady introduce to him Creole gumbos and divers shrimp dishes; and a black mammy anywhere in the interior South instruct him in the right use of the frying pan; and a Mexican elucidate for him the delectable mysteries of commingled maize, red peppers and beans. As a finished product, he won't last long, though, in this lesser sphere. Blessed Providence will put forth its almighty hand and pluck him up to heaven to cook for the angels.

—IRVIN S. COBB in *Cosmopolitan*.

OF SPECIAL INTEREST

DO YOU KNOW THAT . . .

Alpha Epsilon

Dr. B. R. Speicher, '30 will act as research assistant to Dr. Whiting, under a grant from the Committee on the Effects of Radiation on Living Organism of the National Research Council.

Beta

In a sectional meeting of the Geological Congress, last July, F. R. Clark, '19, explained the origin and accumulation of oil.

Delta

Dr. G. B. Ramsey, '17, market pathologist of the U. S. Department of Agriculture, lead a group of plant pathologists on an interesting tour through the South Water Markets.

Dr. P. W. Whiting, '25, professor of Zoology at the University of Pittsburgh, has been invited by Dr. Chas. B. Davenport to spend the coming year at the Station for Experimental Evolution, Carnegie Institution of Washington, Cold Spring Harbor, New York.

Zeta

A second symposium of the Zoological Sciences of the American Association for the Advancement of Science, was held for the purpose of discussing the problem of aquatic animals and their environment. The following phases of the question were considered: The centrifugable plankton and non-centrifugable organic content of water, Dr. E. A. Birge, '24, Ecology of lake fishes, Dr. A. S. Pearse, '20.

Zeta

Dr. E. J. Kraus, '21, presided at the first meeting held under the auspices of the Botanical Society of America at the Field Museum of Natural History last June.

Zeta

Dr. Stillman Wright, '24, formerly limnologist of the U. S. Bureau of Fisheries, one of several skilled investigators lost from the service because of the needs of economy, has sailed from New York for Rio de Janeiro to join the Brazilian Government in a study of fish forming possibilities in the numerous artificial lakes and reservoirs in North-eastern Brazil.

Theta

Dr. Alex Laurie, '27, presented, to the American Society of Plant Physiologists, last June, a paper discussing the practical results of photo-periodic responses of green-house crops and certain floral species.

Iota

Dr. E. S. Reyloulds, '27, presented a critical paper dealing with growth as a criterion of physiologic responses to radiation, at the American Society of Plant Physiologists.

Dr. H. S. Gosser, '27, discussed the relation of beat activity to nerve activity of respiration, chemical and electrical factors, at a meeting of the Zoological sciences, section F. of the American Association for the Advancement of Sciences held in Chicago last June.

Mu

Chester Stock, '23, described to the geologists, recent finds from caves in various parts of the Southwest, at the sixteenth International Geological Congress meeting in Washington, D. C.

Dr. T. H. Eaton, '31 and Dr. Charles M. Wheeler, '31 are members of the expert personnel of the Rainbow Bridge-Monument Valley Expedition.

Mu

Dr. A. R. Davis, '24, discussed the problem of interrelation of light and temperature at the symposium of the American Society of Plant Physiologists held last June.

The Gehomann Lectures for this year were given by Dr. Karl F. Meyer, '24, director of the George Williams Hooper Foundation and professor of bacteriology.

HENDERSONIANA

AMONG the species of plants named after Professor Henderson, new honorary member of Mu chapter, are: *Carex hendersoni* Bailey, *Erythronium hendersoni* Watson, *Brodiaea hendersoni* Watson, *Dodecatheon hendersoni* A. Gray, *Angelica hendersoni* Coulter and Rose, *Sidalcea hendersoni* Watson, *Horkelia hendersoni* Howell, *Astragalus hendersoni* Watson (later found to be a homonym and renamed *pacificus* Sheldon), *Eriogynia hendersoni* Canby (now placed in *Spiraea*), *Oryzopsis hendersoni* Vasey, and *Aster hendersoni* Fernald.

Among Professor Henderson's publications may be cited:

- The Flora of the Olympics. *Zoe* II, 1891, p. 253-295.
 A New Isoetes from Idaho. *Bot. Gazette* XXIII, 1897, p. 124-125.
 Two New Species of Plants from the Northwestern United States. *Contrib. U. S. Nat. Herb.* V, 1897-1901, p. 201-202. pl. XXVI.
 Smuts and Rusts of Grain in Idaho, and the most approved methods of dealing with them. *Univ. Idaho Agric. Exper. Sta. Bull.* 11, 1898, p. 3-32.
 Twelve of Idaho's Worst Weeds. *l. c.*, 14, 1898, p. 91-136, 5 figs. pl. I-XIII.
 Apple Scab in the Potlach. *l. c.*, *Bull.* 20, 1899 or 1900 (not seen).
 New Plants from Idaho and from other localities of the Northwest. *Bull. Torrey Bot. Club* XXVII, 1900, p. 342-359.
 Mushrooms or Toadstools: A Natural Food Product. *Univ. Idaho Agric. Exper. Sta. Bull.* 27, 1901, p. 27-64. 11 figs.
 Some Spraying Experiments for 1901. *l. c.*, 31, 1902, p. 55-67.
 Grass and Forage Plants in Idaho. *l. c.*, 38, 1903, p. 193-256, illustrated.
 Some Experiments with Fungus Diseases in 1903. *l. c.*, 39, 1904, p. 257-272.
 Potato Scab. *l. c.*, 52, 1906, p. 3-8.
 Experiments with Wheat and Oats for Smut. *l. c.*, 53, 1906, p. 3-15.
 Mixed Sprays for Apple Scab and Codling Moth. *l. c.*, 55, 1907, p. 3-27.
 The Rex Spray and other Lime and Sulphur Compounds. *l. c.*, 56, 1907, p. 3-12.
 Spraying Experiments in 1907. *l. c.*, 61, 1908, p. 3-15.
 New Plants from Oregon. *Rhodora* XXXIII, 1931, p. 203-206.
 A New *Seriocarpus* from Oregon. *Madroño* II, 1933, p. 105.

HONORS - GRANTS - ELECTIONS AND APPOINTMENTS

Beta

Dr. Howard B. Lewis, '23, head of the department of physiological Chemistry, succeeds Dr. Kraus as dean of the College of Pharmacy.

Dr. E. C. Case, '20, is a representative of the Geological society of the National Research Council for the year 1933-1934.

President Alexander G. Ruthven, '30, of the University of Michigan, formerly professor of zoology and director of museum, received the de-

gree of doctor of laws on June 12 from Denison University. Dr. Ruthven gave the address at the commencement exercises.

Zeta

Dr. Andrew E. Murneek, '22, of the University of Missouri, was elected secretary-treasurer of the American Society of Plant Physiologists.

Iota

Dr. Frank Blair Hanson, '21, professor of Zoology at Washington University, St. Louis, has been appointed assistant director of the Natural Science Division of the Rockefeller Foundation.

Dr. Edgar Allen, '22, formerly dean of the University of Missouri School of Medicine, has taken up his work as professor of anatomy and head of the department at Yale University.

Dr. S. W. Ranson, of Northwestern University Medical School, has received a grant from the Committee on Scientific Research of the American Medical Association for the continuation of his study of the cutaneous nerves in man.

Kappa

Dr. Erma A. Smith, '20, associate professor of physiology at the Iowa State College, has been allotted a grant by the American Medical Association to be used in a study of the effects of sublethal percentages of illuminating gas.

Sigma

Dr. Bernard V. Christensen, '31, head of the department of pharmacognosy and pharmacology, University of Florida has been appointed director of the school of pharmacy. The college of pharmacy was recently classified as a school and placed under the college of Arts and Sciences.

HAVE YOU READ

Alpha

"Shifting Corn Belt May Have Influenced Culture Migrations," says Prof. Paul B. Sears, '16, of the University of Oklahoma. This article appears in the September 16 issue of the Science News Letter.

Epsilon

"The Pneumatic System of Plants Especially Trees," by D. T. MacDougal and Carl B. Working, '17—Carnegie Institution of Wash-

ington, 87 p., paper bound 75 cents, cloth \$1.50. This up-to-date edition is very favorably received in Science News Letter, Aug. 3, 1933.

Zeta

"Sex Control Method Fails in Test on Farm Animals", in Science News Letter of September 23, 1933. The method tested in the experiment of Prof. Cole, '27 and Dr. Johansson, '25, was originated by a German physician, Dr. Unterberger of Königsberg.

Zeta

"Fermentation Frees Seeds From Bacterial Disease", in the July 1, 1933 Science News Letter. This discovery was made by Dr. H. L. Blood, '29, of the U. S. Department of Agriculture.

Mu

"Mosquitoes Carry Sleeping Sickness to Horses", in the September 9, 1933, Science News Letter. The possibility of the disease transmission by insects is brought out in the research work of Prof. K. F. Meyer, '24, and his associates.

Xi

The Science News Letter of September 9, 1933 carries an account of the special study of Prof. J. E. Weaver, '25, "Roots are Bur Oaks Chief Weapons in Prairie Invasion."

PATTER

Most girls have a skin they love to retouch.—*Thomaston (Ga.) Times*.
Mae West, in *I'm No Angel*, climbed the ladder of success wrong by wrong.

A woman has two views of a secret. Either it's not worth keeping, or it's too good to keep.

The stork is the bird with the big bill.

A lot of good buys in Wall Street turned out to be farewells.
—*Kalends*.

Troubles are like babies—they only grow by nursing.
—*Douglas Jerrold*.

One touch of scandal makes the whole world chin.

The secret of repartee is repertoire.

THE 1933 CONVENTION

What Happened There

First Session

WITH Vice-Chancellor Warren in the chair, the Chicago Convention of Phi Sigma opened at 9:15 a. m. Monday June 26, in Room 546 of the Stevens Hotel. All the national officers with the exception of the retiring Chancellor, Dr. P. B. Sears, were present. After the appointment of a Credentials Committee under the chairmanship of Treasurer Stewart, the Convention listened to the brief opening remarks of Vice-Chancellor Warren, and heard the reports of Secretary Ortenburger, Treasurer Stewart, and Editor Keefe. Committees were next appointed:—Resolutions, under the Chairmanship of Dr. Ortenburger, with delegates from Psi, Alpha Alpha, and Alpha Delta; Nominations, under Dr. Keefe with Beta and Omega delegates; Constitutional Amendments, under the Chairmanship of Treasurer Stewart, and the delegates from Theta, Kappa, Lambda and Alpha Iota; Admission of Colored Members, under Mr. L. K. Henry of Alpha Epsilon as Chairman, and delegates from Tau and Alpha Zeta; Admission of Summer School Students: under the Chairmanship of Mr. Dahms of Alpha Eta, and delegates from Epsilon and Alpha Beta.

Calls were next made, first, for old business, later, for new business. The question having been raised whether all delegates were welcome at all committee meetings or not, Dr. Warren ruled that delegates were not only very welcome, but should be interested enough to attend as many committee sessions as possible. The Credentials Committee not being ready to report, Omega moved that all delegates be temporarily seated pending his committee's final report. Seconded by Psi, and carried.

The call for suggestions to the summer sessions committee precipitated a discussion in which Alpha Eta, Stewart, Epsilon and Alpha Zeta took part. When Dr. Warren called for suggestions for consideration by the committee on admitting colored members, the delegates from Psi, Lambda, Kappa, Alpha Alpha, Beta and Zeta offered suggestions based on procedure in their own chapters. Iota's motion for adjourning went unseconded. Kappa next offered certain proposed amendments for the consideration of the Constitutional Amendments Committee. The committee was considerably enlightened and instructed by the subsequent

discussion initiated by Beta, and participated in by Theta, Kappa, Epsilon and many others. Omega brought up a question about honorary members which was referred to the constitution committee.

Dr. C. I. Reed of the Medical College of the University of Illinois, for many years the first National Secretary of Phi Sigma, had been an interested auditor to the preceding discussions. He was now called upon by Dr. Warren to address the Convention. After extending his good wishes and encouragement to the delegates, Dr. Reed gave an account of his activities as chairman of the Phi Sigma Endowment Committee. At the conclusion of Dr. Reed's address, Kappa moved the committee be continued, which motion was seconded and passed. A further motion by Kappa to adjourn also passed.

Second Session

The second session was devoted to the reading of scientific papers as scheduled in the A. A. A. S. Program.

1. Depth Studies on Photosynthesis in the Red Algae. (10 min.) R. H. TSCHUDY, University of Washington.

2. Tabanidae of Oklahoma. (15 min.) HAROLD SCHNORRENBURG, Oklahoma A. and M. College.

3. Parasites on the Roots of *Ledum groenlandicum*. (10 min.) JOHN R. ROBERTS, University of Washington.

4. Spermiogenesis in *Amblycorypha oblongifolia*. (7 min.) MARCELINO T. SURLA, University of Kansas.

5. Biological Condition in a Puget Sound Lake. (10 min.) VICTOR B. SCHEFFER, University of Washington.

6. Effect of Pituitary Hormones upon Development of the Immature Chick. (10 min.) CHARLOTTE DUMONT, University of Denver.

7. Preliminary Report of the Enzymes Found in the Rhizomorphs of *Armillaria mellea*. (10 min.) WILL M. LANPHERE, University of Washington.

8. Effect of Urinary Hebin upon Spermatogenesis. (10 min.) MILTON MOLIEN, University of Denver.

9. The Relation Between Amount of Tuberculo-protein and Time of Administration in the Development of Allergy. (10 min.) JAMES DURWARD THAYER, University of Washington.

10. Ovulation in Immature Rabbit as Result of Blood Transfusion. (10 min.) CHARLOTTE DUMONT, University of Denver.

11. Some Properties of Kelp colloids. (10 min.) GEORGE B. RIGG and BERNADINE DUNSFORD, University of Washington.

12. Description and Habits of a New Specie of the Genus *Sarcophaga*. (10 min.) CHRISTIAN C. DEONIER, Oklahoma A. and M. College.

13. The Problem of Leaf Specialization from the Standpoint of Ontogeny. (15 min.) (Lantern) FRED BARKLEY, University of Oklahoma.

14. A Study of Double Monstrosity in a Guinea Pig. (10 min.) MRS. FREDERICK E. BECKER, University of Denver.

15. Studies on the Morphology of Western Salamander During Metamorphosis. (5 min.) IRA ROCKWOOD TELFORD, University of Utah.

16. Skin Pigmentation Among Colorado Students. (10 min.) CHARLOTTE MORRELL PEARCE, University of Denver.

17. A Study of Mineral Deficiency in Plants as Affected by Soil Conditions. (10 min.) HARLEY A. DANIEL, Oklahoma A. and M. College.

18. Preliminary Summary of the Pentatomidae of Utah Based Upon the Genital Clasps of the Male and the Margins of the Genital Sinus. (5 min.) JOHN ALLEN ROWE and LOWELL WOODBURY, University of Utah.

19. Soil Relations of Oklahoma Ferns. (10 min.) CLARA E. STILL, Oklahoma A. and M. College.

20. Studies on the Amnicolid Snails of Utah. (5 min.) ELMER G. BERRY, University of Utah.

21. Pottery of Rocky Mountain National Park. (10 min.) BETTY YELM, University of Denver.

PAPERS TO BE READ BY TITLE

22. Problem Solving Activity in the Rhesus Monkey. CHARLES D. YOUNG, University of Kansas.

23. A Comparative Study of Brain Action Currents in Vertebrates. F. THEODORE PERKINS, University of Kansas.

24. Some Noteworthy Anatomical Features of the Wood of *Staphylea trifoliata*. D. J. OBEE, University of Kansas.

25. Studies on Anaphylaxis in Cats. PAUL KABLER and N. P. SHERWOOD, University of Kansas.

Third Session

After the call to order by Dr. Warren at 9:15 Tuesday morning, chapter reports were received. Next, Dr. Warren outlined the day's order of business. Chairman Stewart of the Credentials Committee moved the seating of delegates from the chapters in arrears, Epsilon Iota and Chi. It was seconded by Omega and passed. The Committee

on Admitting Colored Members next gave, through Chairman Henry, the following report: "The Committee are of the opinion that, since there is nothing in the Constitution to prevent the election of colored members, the selection of members should be left to the discretion of the individual chapters." Alpha Epsilon moved acceptance, Beta seconded, and it passed. The Summer Session Admittance Committee reported through Chairman Dahms of Alpha Eta as follows: "The committee recommends that candidates in the summer session be admitted to Phi Sigma membership provided the active members vote to hold a summer initiation and provided that two officers, either the president or vice-president, and either the secretary or the treasurer are present at the initiation and take care of all the business of installing the new members." On Dahm's motion and Epsilon's second, the report was submitted to a discussion freely participated in by Warren, Stewart, Brookhout, Barkley, Sager, and others. It was finally carried. Zeta moved an amendment that at least one-third of the preceding semester's active membership should be present to vote on summer session candidates. Seconded by Omega, discussed and dropped.

The next report was presented for the Resolutions Committee by Mr. Tschudy of Psi:

"The committee wishes to report the following resolutions:

"Whereas the A. A. A. S. has made a place for us on their program;

"And whereas, Dr. Philip Fox and his local committee have contributed much to the success of our convention;

"And whereas, Mr. E. W. Milligan has given his assistance so freely to the Editor of the Biologist:

"And whereas, the present National officers have given so liberally of their time and efforts, and conducted their offices more efficiently than is reasonable to expect;

"Be it therefore resolved:

That thanks be conveyed from Phi Sigma to the A. A. A. S., and to the above mentioned individuals for the services they have rendered to the Society."

Kappa moved acceptance of the resolutions, it was seconded and carried. Dr. Warren next called for the Constitutional Committee's report. This was presented section by section by Chairman Stewart. There was some discussion on the various proposals, but they were all eventually adopted as amendments to the constitution.

Referring to chapters at conventions—

As amended the second sentence of Art. I, Sec. 4, (a) reads: "Each chapter *in good standing* shall be entitled to representation." Article IV, Sec. 6, relating to transferring members now reads: "The transferring candidate shall be declared a member of the admitting chapter, etc. . . . For all purposes of record in the National Office the member shall remain a member of his parent chapter." By Laws, Sec. 1, now reads:

Section 1. (a). The regular initiation fee for active members shall be Eight Dollars, of which Three Dollars shall be paid into the National Treasury for convention expenses. Two Dollars shall be paid to the National Treasury as subscription for *The Biologist*. The remaining Three Dollars shall go to the local chapter. Payment of the initiation fee shall exempt any initiate from further national dues for the remainder of the school year, except assessments levied after his initiation. The purchase of a key shall be optional; but an initiate not purchasing a key shall contribute the sum of One Dollar to the National Treasury for the Endowment fund.

By Laws, Sec. 2, now reads:

Sec. 2. The Treasurer of each chapter shall collect and pay into the National Treasury the sum of One Dollar for each active member, the same to be paid on or before the 1st of December of each year. This assessment shall be called the General Academic Assessment and each one shall be serially numbered. This assessment shall be assigned to the General Fund.

The constitutional amendments having been almost unanimously adopted, Dr. Warren called for new business. Beta asked for suggestions on holding good meetings. Dr. Warren placed the question before the house. One minute was by unanimous agreement allotted to each delegate for reports on local chapter meeting programs and procedures. Before this part of the meeting was carried out, however, Dr. Warren appointed the delegates from Phi and Mu as tellers for the forthcoming election. He then turned the gavel over to Dr. Keefe.

The chapter reports followed in rapid succession. Omega moved the election of new national officers. Dr. Keefe called for the Nominating Committee's report. Acting Chairman De Bruine of Beta presented the name of Dr. Paul A. Warren, present Vice-Chancellor, to succeed Dr. Paul B. Sears as Chancellor. Omega moved Dr. Warren's unanimous election. On a point of order, Dr. Keefe called for nominations from the floor. Sager, Zeta, moved closing nominations, Psi seconded, and on unanimous vote Dr. Warren was made Chancellor. As nominees to succeed Dr. Warren in the Vice-Chancellorship, the committee presented the

names of Dr. Melville H. Hatch of the University of Washington, and Dr. Lee Bonar of the University of California. On call for further nominations from the floor, Iota presented the name of Dr. Leigh Hoadley of Harvard University. Alpha Lambda called for data on proposed candidates. Delegates from Psi spoke for Dr. Hatch, from Mu for Dr. Bonar, and from Iota for Dr. Hoadley. On the second ballot Dr. Hatch was declared elected. The Nominations Committee then presented the name of Erwine Hall Stewart to succeed himself as Treasurer. Epsilon moved, and Iota seconded, closing the nominations immediately. On a secretary's ballot Mr. Stewart was declared elected. The election tellers then ushered Chancellor Warren and Treasurer Stewart back into the applauding Convention. Each spoke briefly on his election. On motion of Omega the second and final business session of the Convention was adjourned sine die.

Fourth Session

The fourth session was devoted to the reading of the scientific papers as scheduled in the A. A. A. S. Program.

26. A Study of the Tracheation and Venation of *Samia gloveri* Streek. (5 min.) JOHN ALLEN ROWE, University of Utah.

27. An Algal Habitat in the Salt Marshes. (10 min.) NINA HOSLER LOOMIS, University of Southern California.

28. The Rhythmic Activity of the Rat Under the Effects of Sodium Amytal and Sodium Thiocyanite. (5 min.) DONALD E. FLETCHER, University of Kansas.

29. The Root Systems of Some Common Ornamental Bulbous Plants Under Forcing. (10 min.) WARREN WESLEY NEDROW, University of Denver.

30. Some Factors Involved in the Augmentation of the Coronary Bloodflow Following the Intravenous Injection of Hypertonic Glucose Solution. (10 min.) DAVID TAYLOR LOY, University of Kansas.

31. Notes on Cuterebra Larvae (Diptera: Cuterebridae) Infesting the Oklahoma Cotton Tail Rabbit. (5 min.) (Lantern) ARTHUR B. LEONARD, University of Kansas.

32. An Ecological Study of the Ants of Oklahoma. (10 min.) WILTON M. FISHER, University of Oklahoma.

33. A Discussion of Cestoda of Poultry Found in and Around Douglas County, Kansas. (10 min.) QUIRINO B. FERRY, University of Kansas.

34. History and Development of Germ Cells After Birth in the Male Guinea Pig. (15 min.) (Lantern) CAZLYN GREEN BOOKHOUT, Duke University.

35. The Vitamin D Assay of Corn Silage. (10 min.) H. ERNEST BECHTEL, C. W. DUNCAN, and C. F. HUFFMAN, Michigan State College.

36. The Effect of Subcutaneous Injections of Full Term Female Melanephric Extract upon White Rats. (5 min.) RALPH W. KOTTKAMP, University of Kansas.

37. The Bromo M-Cresols: Bactericidal Properties and Chemical Constitution. (10 min.) W. J. PETERSON, Michigan State College.

38. Genes as Single Molecules. (10 min.) HERBERT STEPHEN WALLACE, University of Denver.

39. The Effect of a Filtrable Portion of K Medium on the Filtrability of *Escherichia Coli*. (10 min.) O. F. EDWARDS, Michigan State College.

40. Respiration of Vertebrate Red Blood Cells. (5 min.) SAMUEL RIDLEY TIPTON, Duke University.

41. Microsporogenesis in *Philadelphus grandiflorus* Willd. (Mock Orange). (5 min.) LEWIS E. ANDERSON, Duke University.

42. The Prenatal Effect of CO on Albino Rats and Resulting Neural Pathology. (10 min.) LLOYD L. WELLS and WALTER E. BATCHELDER, University of New Hampshire.

43. Embryology of the Spleen in *Amia calva*. (15 min.) (Lantern) HARVEY DEBRUINE, University of Michigan.

44. Notes on Carrion Insects of Oklahoma. (10 min.) WILTON M. FISHER, University of Oklahoma.

45. Paleontology and Correlation of the Upper Cretaceous Beds Along the Eastern Side of the Laguna de Mayror, Coahuila, Mexico. (10 min.) RALPH W. IMLAY, University of Michigan.

46. A Study of Some Parasites Infesting Rabbits of Central Oklahoma. (10 min.) JAMES W. WARD, University of Oklahoma.

47. Polyporaceae of New York State. (7 min.) (Lantern) JOSIAH LINCOLN LOWE, University of Michigan.

PAPERS TO BE READ BY TITLE

48. Investigations in the Resinous Secretions and Secretory System of *Liatris scariosa*. W. W. MAYBERRY, University of Kansas.

49. A Study of Some of the Factors Influencing Germination of the Spores of *Phyllosticta solitaria*. IRMA BURGERT, University of Kansas.

50. Morphology and Anatomy of *Lygodesmia juncea* (Purch) D. Don. LIZA SPANN, University of Kansas.

51. A Study of Antigens and Their Fractions by Micro-flocculation Tests. N. P. SHERWOOD and H. F. CLARK, University of Kansas.

Fifth Session

The fifth session of the 1933 Convention took the form of a reception and Banquet. In the charming club rooms of the Chicago Women's Club a reception was held at 6:30 for the National Officers and the guest of honor, Dr. Leon J. Cole, (Zeta) of the University of Wisconsin. Following the reception, there was a banquet in the Main Dining Room of the Women's Club, during which each of the members and guests present was introduced. Following the dinner Dr. Cole delivered an intensely interesting lecture on "Fertility in Hybrids," based on the results of his research on pigeons and rabbits as head of the Department of Genetics at the University of Wisconsin.

Sixth Session

Wednesday morning was given over to the reading of the concluding papers in the long and representative list sponsored by Phi Sigma in the A. A. A. S. Program.

52. Ornithological Nomenclature. (10 min.) CORA MAY LIFE, University of Southern California.

53. Early Blastodermic Vesicles of the Horse. (10 min.) BRUCE MAGILL HARRISON, University of Southern California.

54. Embryonic Development of the Nasal Chambers of the Horse. (10 min.) BOYER WARREN VOISARD, University of Southern California.

55. Some Stages in the Development of the Hepatic and Pancreatic Ducts of the Embryo Horse. (10 min.) AARON JENSEN, University of Southern California.

56. A Successful Transplantation of Regenerating Tail Blastema in *Triturus viridescens*. (10 min.) HOMER CLIFFORD PORTER, Washington and Jefferson College.

57. A Study of the Gross Anatomy of the Gar-Pike Brain (*Lepisosteus osseus*). (15 min.) HAROLD ZINTEL, Akron University.

58. Mitochondrial Morphology in Diuresis. (10 min.) GILBERT M. BLUNT, State College of Washington.

59. The Gram Stain and Differential Staining. (10 min.) M. L. KAPLAN and LEAH KAPLAN, Hunter College.

60. The Life History and Feeding Habits of a New Species of Checkered Beetle of the Genus *Aulicus* Spin. (10 min.) E. GORTON LINSLEY, University of California.

61. The Stimulation of Cell Division with Reduced Sulfur Compounds. (10 min.) OLIN RULON, University of Chicago.

62. A Similitude of the Mind. (10 min.) JOHN THADDEUS SZYPULSKI, Bucknell University.

63. An Investigation of the Inequality of the Pheocyplsis Exhibited by Leucocytes in Pyogenic Infection. (10 min.) WILLIAM PIERCE BOGER, JR., Bucknell University.

64. The Bacterial Content of Raw and Pasteurized Milk. (10 min.) EDWARD GEORGE MARKIN, University of Montana.

65. The Thyroid Gland in Chickens. (10 min.) MARIE LOCKETT HOPKINS, University of Montana.

66. A Study of an Interglacial Flora and Fauna. (10 min.) RUSSELL JOHN LONG, Miami University.

67. Adaptation of *Bacillus coli* Bacteriophage to Tuberculosis. (5 min.) RICHARD FREDRICK MILLER, Miami University.

68. Genetic Status of Baldness in Rats. (10 min.) NORMAN THOMAS MATTOX, Miami University.

69. The Presence of Ostracods in The Arnheim Formation. (5 min.) WILLIAM KINCAID MACFARQUHAR, Miami University.

70. The Protozoa of the Oklahoma Salt Plains. (10 min.) NELL GUTHRIE, University of Oklahoma.

PAPERS READ AT CONVENTION

THE following papers represent only a portion of those read at the sessions held during the Chicago Convention. Since many of them are preliminary surveys, or merely abstracts of the real papers presented, they convey only a faint impression of the tremendously rich supply of scientific data revealed.—EDITOR.

Depth Studies on Photosynthesis of the Red Algae

ROBERT H. TSCHUDY, *University of Washington*

The work was accomplished by placing strips of algae in large test tubes, fastening these in wire baskets horizontally, and suspending the

tubes in baskets at various depths. *Nereocystis leutkeana* was used for comparison in all experiments. Photosynthesis was determined by measuring the oxygen given off. The Winkler method for the determination of oxygen was used.

It was found that most photosynthesis takes place in less than 10 meters of water in both red and brown algae: that there was photosynthesis in the reds at 25 meters, while the browns were unable to synthesize in more than 15 meters of water; that maximum synthesis takes place at 5 meters depth. It is probable that the red algae are able to utilize the shorter wave lengths of light in much the same manner as do "shade plants", and not particularly because they possess a red color.

A Parasitic Fungus on the Roots of *Ledum Groenlandicum*

JOHN R. ROBERTS, *University of Washington*

The relation of fungi to the roots of bog plants has long been an interesting field for investigation. While the writer was working on this problem—*Collybia exsculpta* was found to be parasitic on the roots of *Ledum groenlandicum*.

Three methods were used in dealing with this investigation a cultural method, microscopic-section, and the other a method of tracing the mycelium of the sporophores to the roots of the *Ledum* (in the field).

The results show that the mycelium of *Collybia* was present in the roots and that it was both intercellular and intracellular. This mycelium was inoculated back on to the roots of other *Ledum*.

Several investigators have reported the presence of other fungi in the roots of this plant. However, they regard this to be of a mycorrhizal nature. But definite results must be obtained of mutual benefit to both plants before it can be called a mycorrhiza as mutualism differs in different plants. The mycelium of *Collybia* must be regarded as a parasite until further work has been done to prove the symbiotic relationship.

Further research is needed in order to expand our knowledge concerning just what fungi are present in bogs and what are their relation to the roots of the various bog plants. It is very probable that future investigators will demonstrate that mycorrhiza is present in bogs as there is indication of them at present.

Spermiogenesis in *Amblycorypha oblongifolia*

M. T. SURLA, *University of Kansas*

This paper deals with the study of the spermatid transformation in *Amblycorypha oblongifolia*, one of the false katy-dids. A detailed de-

scription of the development of the spermatid structures, with special emphasis on the nebenkern, acroblast and centrioles, is given. All changes undergone by these structures from the young spermatids up to their highly modified condition in the mature spermatozoa have been followed carefully.

Comparison has also been made with the spermatid transformation of closely related species thus far examined and with that of other groups of insects studied recently.

The following give the summary of this paper:

1. The mass of chromosomes in each daughter cell after the last maturation division breaks up into chromatin patches which gradually become diffused through the nucleus. Later a differentiation of the nuclear material into a basichromatic substance and an oxyphilic substance takes place. From the basichromatic substance is formed the solid deeply staining fusiform sperm nucleus.
2. The mitochondrial substance assorted to each spermatid clumps into a mass. This rapidly condenses and finally rounds out to form the spherical nebenkern. The nebenkern, after undergoing many changes, differentiates into an inner chromophilic core and outer chromophobic part. Later it comes to lie on or below the axial filament, elongates with this structure and finally forms a thin sheath around the flagellum.
3. The Golgi bodies in each spermatid fuse. The mass resulting from the fusion comes to lie against the nuclear membrane near the nebenkern. From it a small vesicle is differentiated which rapidly increases in size to form the so called acroblast. The acroblast migrates around the nucleus and, after the differentiation of the acrosome complex in close connection with it, its remnant is finally cast off into the cytoplasm. The acrosome complex which consists of a vesicle containing a dark granule, becomes the huge definitive acrosome, having the shape of an inverted V in its final form.
4. The spherical centriole divides into proximal and distal parts. From the distal centriole a derivative arises, which migrates caudad and finally disappears from view in the last stages of the transformation. Later the proximal and distal centrioles, each divides into two. The resulting four centrioles participate in the formation of the middle-piece.
5. The axial filament apparently arises from the central bodies, but it has not been determined whether or not from the distal centriole.

From it the comparatively short flagellum of the mature spermatozoon is formed?

6. The spermatozoon consists of a huge inverted V-shaped acrosome which stains lightly or not at all, a solid intensely staining fusiform nucleus, at the posterior end of which is attached the scarcely distinguishable compact middlepiece, and a short flagellum which measures approximately twice that of the head.

Biological Conditions in a Puget Sound Lake

V. B. SCHEFFER, *University of Washington*

A limnological study covering a period of one year was made on a shallow glacial lake 14 acres in area. Physical and chemical observations at four depth-levels each month cover temperature, turbidity, and volume of water; dissolved oxygen and pH. Quantitative plankton samples taken concurrently show vertical and seasonal distribution, total volumes, and abundance of dominant species. In the moderate climate of the Puget Sound region the surface waters did not freeze but ranged from 4.5° C. in January to 22.9° C. in July. Rainfall caused a maximum increase of 7.8 of the total volume of water. Dissolved oxygen was absent from the bottom waters from August to October inclusive. Acidity of the water was general throughout the year and reached a maximum of pH 5.8 at the bottom in June. The plankton showed definite stratification and seasonal distribution, with corresponding effect on the turbidity of the water.

A Preliminary Report of the Enzymes Found in the Rhizomorphs of *Armillaria mellea*

WILLIAM M. LANPHERE, *University of Washington*

The rhizomorphs used for the extraction of the enzyme material were collected from a shallow well. They grew out into the water from the curbing, thus material free from foreign matter was obtainable in large quantities. The rhizomorphs were ground in a mortar with a small amount of water, the enzymes being precipitated with alcohol. When experiments were to be set up, ten cc. of the substrate was used in each of three test tubes. Two cc. of the enzyme solution, representing two grams of the fresh rhizomorphs, was added to the first tube. A boiled control was used in the second tube, while the third was set up as a water control. This procedure was used wherever possible. Toluol was used as the preservative.

The enzymes found in the rhizomorphs of *Armillaria mellea* are diastase, inulase, invertase, rennet, oxidase, peroxidase, and catalase; the enzymes for which tests were made and not found are hemicellulase, maltase, lactase, and the esterases.

The Relation Between Amount of Tuberculo-protein and Time of Administration in the Development of Allergy

J. DURWARD THAYER, *University of Washington*

The object of the investigation was twofold: first, to determine whether allergy, as tested by the Mantoux skin test, can be induced by daily and weekly injections of tuberculo-protein; and, secondly, to determine the degree of sensitivity resulting from the weekly inoculations of the dose of antigen most efficient in the desensitization of tuberculous guinea pigs.

Suitable protocols were used to compare the degree of sensitivity produced by daily and weekly administrations of the antigen.

The results show that daily inoculations of tuberculo-protein sensitize in direct proportion to the amount of antigen given, while weekly doses appear to sensitize in inverse proportion to the amount of antigen inoculated.

The degree of sensitivity resulting from the weekly inoculation of 0.1 mg. of tuberculo-protein (the dose most effective in the desensitization of tuberculous guinea pigs) was about a 2+ reaction. It is concluded that desensitization of tuberculous guinea pigs below this point will be impossible with this dose of antigen.

Effects of the Introduction of Blood from Bred Rabbits upon Immature Rabbits

CHARLOTTE DUMONT, *University of Denver*

The purpose of this study was to demonstrate the occurrence of the anterior lobe hormone in the blood of the bred rabbit during the time elapsing between coitus and ovulation.

In the first series of experiments 24 rabbits were bled to death at times varying between 1½ and 12 hours post-coitum. The serum varying in amounts between 20 and 60 cc. was injected into immature females. One animal that had received 60 cc. of serum from a donor killed 1½ hours post-coitum responded positively.

In the second series, the donors were killed between 1½ and 2 hours post-coitum, the blood defibrinated and immediately introduced intra-

venously into immature females which had first been bled of part of their own blood. Five of the 12 animals used responded positively, with either large corpora hemorrhagica or corpora lutea resulting. Controls given corresponding amounts of blood from unbred females or from males failed to respond.

In a third series of 13 animals performed during the months of October, November and December of 1932, the following technic was employed: Three donors were killed 1 to 1½ hours post-coitum, the blood defibrinated and introduced alternately in quantities of 40 cc. after 40 cc. of the recipients own blood had been taken out. Five out of the 13 animals responded positively. That is all ovaries showed large, well developed corpora hemorrhagica. In a fourth series of experiments performed during the months of March and April of 1933, the technic used in series 3 was repeated on 7 animals. All seven gave positive results as tabulated.

Rabbit No.	Post-Cop'y Time	Amt. Blood Inj'd. into Recip't	Amt. Blood Removed from Recip't	Time Killed Post-Inj'n
13	1 Hr.	260 cc.	220 cc.	48 Hrs.
14	1 Hr.	240 cc.	220 cc.	65 Hrs.
15	1 Hr.	300 cc.	280 cc.	64 Hrs.
16	1 Hr.	280 cc.	240 cc.	64 Hrs.
17	1 Hr.	280 cc.	240 cc.	65 Hrs.
18	1 Hr.	300 cc.	260 cc.	64 Hrs.
19	1 Hr.	290 cc.	270 cc.	65 Hrs.

Results: All ovaries showed well developed follicles (blood).

In conclusion, we have obtained evidence supporting the theory that ovulation in the rabbit occurs as a result of an increased production of anterior lobe hormone.

Some Properties of Kelp Colloids

GEORGE B. RIGG AND BERNADINE DUNSFORD, *University of Washington*

1. Colloidal preparations have been made from both ground and whole fronds of *Nereocystis* by extracting with cold distilled water and dialysing in collodion sacs.
2. The solid matter in the dialyzed preparations averages 0.079% and in the undialyzed 2.4%.
3. The pH of the preparations has been determined with a quinhydrone electrode. The average for the dialyzed preparations is 5.58 and for the undialyzed 6.43.
4. The dialyzed preparations give a flaky precipitate with electrolytes.

5. Freezing produces no visible effects in these preparations. Boiling produces a very slight white precipitate in the undialyzed preparations, but no visible effects in dialyzed ones.
6. The preparations do not separate into two layers on addition of a salt and a few drops of a mineral acid as gelatine does.
7. The behavior of these preparations with a direct current in a U tube with the electrodes immersed in distilled water on top of the colloidal preparation in each arm of the tube has been determined. The undialyzed preparations showed no mixing of the water and the preparation when the current was applied for one hour, but showed a yellowish-white precipitate on the negative side and a thin surface layer of brown material on the positive side. In the dialysed preparations the water accumulated on the negative side and the colloid with a dense white precipitate accumulated on the positive side.

Problem of Leaf Specialization from the Standpoint of Ontogeny

FRED A. BARKLEY, *University of Oklahoma*

The shoot system of Angiosperms often exhibits a high degree of foliar specialization.

For example, in *Paemonia*, at the base of the annual shoot, is a series of scale-like cataphylls, usually followed abruptly by the large foliage leaves. Occasionally a transitional form appears between the uppermost cataphyll and the lowest foliage leaf. Terminating the annual shoot is the flower composed of several sets of foliar organs: Hypsophylls, sepals, petals, stamens, and pistils.

Cataphylls are characteristic of Angiosperms, although they are not universally present. They are also conspicuous in pines and the archaic maidenhair tree, as well as in some ferns.

Paemonia is illustrative of the general problem of why and how does such polymorphism come to be. Aside from the abstract philosophy of Goethe, two general viewpoints have been advanced in explanation:

The first is the evolutionary hypothesis. Goebel's explanation is that the foliage leaf is the ancestral form of the cataphyll, that is, that the cataphyll is a reduced foliage leaf. Domin, Velenovsky, Tyler, and Cook, on the other hand, in their recapitulatory hypotheses derive the foliage leaf from the cataphyll. In either case, our knowledge of the nature of the primitive Angiosperm leaf is too fragmentary at present to support convincingly either evolutionary hypothesis.

The second viewpoint depends upon ontogenetic evidence and comprises: (a) the transformation theory of Goebel, and (b) the differentiation theory.

Goebel has long dominated the field of foliar morphology, with his theory of real metamorphosis; which, briefly stated, is that cataphyll and foliage leaf are morphologically identical in that both organs arise from foliage by primordia. The cataphyll results from an earlier or later divergence in the normal ontogenesis typical of the foliage leaf.

In rather strong contrast to the transformation theory of Goebel, are the results of the recent developmental studies of Schuepp on *Acer*, Foster on *Aesculus* and *Carya*, Diels on *Asarum*, and Foster and Barkley on *Paconia*, which, at least in the plants studied, show that from their earliest appearance, cataphylls and foliage leaves pursue a divergent ontogenesis from the beginning.

Although ontogenetic study is insufficient by itself to explain all the aspects of foliar morphology, it should, when applied to a large number of cases, contribute to our knowledge of this field. When the phylogeny of the Angiosperms is better understood, the evolutionary hypothesis with the data from ontogenetic studies together should give an adequate answer to the problem.

Morphological Studies on the Metamorphosis of *Ambystoma tigrinum* (Greer)

IRA ROCKWOOD TELFORD, *University of Utah*

Ambystoma tigrinum is the common species of salamander frequenting this western region and it was used exclusively as the experimental animal in this work. There were 50 animals studied and, with the exception of animals of the "Z" series, were secured in September, 1933, from the ponds of Mt. Olivet Cemetery, Salt Lake City, Utah, while still in the premetamorphic stage. They were kept in an aquarium of cold fresh water and fed on ground beef and liver, the latter being most extensively used. The animals kept under these conditions continued to remain in the pre-metamorphic condition for the eight months during which they were studied. Only under especially designed conditions were the salamanders induced to complete their morphological change and become true adult specimens. It suffices to say at this point that the observations on the intermediate and the final stages, presented in this discussion, were secured from animals which had undergone some special treatment, the "Z" series animals are again exceptions to this general

rule. These specimens of the "Z" series were secured as adults while in their natural habitat.

The pre-metamorphic specimens were segregated into definite groups or series according to the type of treatment administered. Animals of series "A" were kept continuously in a cold, well aerified water (9°C.) and fed regularly on beef liver. As long as specimens were kept under such conditions they gave no hint of metamorphosis and remained apparently at a standstill in regards to this change for eight months.

Animals of the "B-1" series were kept in cold, well aerified water (9°C.), but in addition were fed thyroid powder (Lilly's); they were each fed daily three small pieces of liver (3mm. cube) covered with as much thyroid powder as would adhere to the meat.

Animals of the "B-2" series were kept in warm, well aerified water (20°C.) and were fed thyroid powder as those above. Force feeding was resorted to in both cases, which insured the animals receiving the amount of extract intended for them. Results of such feedings are as follows: Animals of the "B-1" series required an average of twenty-five days for the shedding of the skin and gill atrophy, the first external signs of metamorphosis, to appear. Animals of the "B-2" series first showed metamorphic changes after an average of fourteen days.

Animals of the "C" series were used to show the effect of iodine implantation on the rate of change. The specimens were anaesthetized, the body cavity opened and a crystal of iodine, half the size of a grain of rice, was placed within the abdominal cavity. They were retained in warm, well aerified water (20°C.). The average latent period was fifteen days before a change was noticed.

The animals of the "D" series were placed under conditions most nearly duplicating the reported natural conditions that favor the metamorphic change. The specimens were placed in a large pan with water of insufficient depth to cover the animals. The water was kept warm (20°C.). To compensate for the loss of water by evaporation, the daily addition of a small amount of water was necessary, thus keeping the water at a uniformly low level. Aerification of the water was impossible. The specimens were fed on an abundance of beef liver which they would grab from the end of a teasing needle. Under such conditions, the latent period, before external signs of Metamorphosis appeared, was reduced to one to three days.

In the "E" series, the specimens were kept under the same conditions as those of the "D" series, except that they were given no food after

the beginning of the treatment. The latent period increased, being four to six days, before signs of metamorphosis appeared.

In an effort to determine other factors regarding this change, several pre-metamorphic animals, series "F", were removed from the water and placed in a moist environment. This consisted of a box filled with sphagnum moss kept moist by the daily addition of a small amount of water. Animals observed in this habitat for ten days failed to show any signs of metamorphosis. These conditions, however, could hardly be considered as "natural" moist environment as the moss would pack down and dry out on top. The temperature varied from 10-20°C.

Immediately after metamorphosis is completed, the salamanders show several characteristics in marked contrast to the pre-metamorphic animals. (1) There is a change in pigmentation, the color changing from dull green to the brownish black characterizing the older adult. There is also an increase in the number of yellow and brown spots. (2) There is a general reduction in body size as is demonstrated by the following table of measurements.

	Pre-metamorphosis	Post-metamorphosis
Body length	115mm	105mm
Tail length	60mm	52mm
Head length	21mm	20mm
Head width	16mm	16mm
Tail width	18mm	11mm
Distance between eyes	7mm	6.5mm

Gills of other animals were amputated, series "G", in an effort to cause or to accelerate the change. The specimens continued to live in the cold aquarium unaffected by the loss of this part of the respiratory apparatus.

SUMMARY AND CONCLUSIONS

Series	Treatment	Length of treatment before first signs of metamorphosis
A	Cold, well aerified water.	No effect.
B-1	Cold, well aerified water and thyroid feeding.	Twenty-five days.
B-2	Warm, well aerified water and thyroid feeding.	Fourteen days.
C	Warm, well aerified water and iodine implantation.	Fifteen days.
D	Warm poorly aerified water of a limited amount, with an abundance of food.	One to three days.

SUMMARY AND CONCLUSIONS—*Continued*

Series	Treatment	Length of treatment before first signs of metamorphosis
E	Same as "D", but no food.	Four to six days.
F	Sudden removal from cold water to moist moss.	No effect in ten days.
G	Amputated gills, animal retained in cold water.	No effect in four months.

As can be seen, the most rapid change took place in series "D".

The actual stages of metamorphosis in *Ambystoma tigrinum*, as observed from external morphological changes, may be listed as follows:

1. The shedding of the skin along the dorsal surfaces, particularly along the dorsal fin.
2. The shedding and absorption of the dorsal fin.
3. The gradual atrophy of the gills beginning with a reduction in the size of the filaments and then a reduction of the stalks.
4. A second general shedding of the skin over the entire surface of the animal.
5. Protrusion of the eyeballs.
6. Rounding out of the tail.
7. Gradual alteration of the pigment patterns.
8. Eyelids developed.

It must be kept in mind that it is impossible to list a definite sequence of events as several of the changes occur simultaneously, and one cannot say that one stage definitely follows or precedes another. These observations can only serve as a general series of events as they were observed in the specimens studied.

With the completion of the process, the following external changes are noticeable:

1. Dorsal and tail fins lost.
2. Total absence of gills.
3. Eyeballs protrude and eyelids present.
4. Pigment pattern changed.
5. Reduction of body size.

Problem Solving Activity in the Rhesus Monkey

CHARLES D. YOUNG, JR., *University of Kansas*

Eight experiments, some old and some new, were carried out with two Rhesus monkeys as the subjects. The new experiments consisted of elevator problems in which the subjects were required to raise a platform

within an elevator shaft first by pulling the rope and later by turning a wheel in order to secure food. All of the experiments brought out the usual criteria of insight and substantiated the recent doubt as regards the so-called trial and error conception of behavior.

A Study of Brain Action Currents in Vertebrates

F. THEODORE PERKINS AND WILLIAM F. BLAIR, *University of Kansas*

Action currents were recorded by means of vacuum tube amplification through an oscillograph and photographed on motion picture film. Records have been obtained from the crayfish, frog, pigeon, rat, and dog, on diverse architectural positions under motor, pain, light, and sound stimuli of various kinds. Correlation maps between the type of response, the type of stimulus, the brain region, and the records were made. In the dog and rat a differential of size and pattern of activity appeared on the records, so that the region which corresponded to a given function gave the greatest response, yet at the same time smaller but significant activity could be recorded from the entire cerebrum. The animals lower in the animal scale showed more homogeneous activity throughout the brain during a given type of response of the animal. Interpretations are made in line with the organismic theory of Child and Lashley.

Some Noteworthy Anatomical Features of the Wood of *Staphylea trifoliata*

D. J. OBEE, *University of Kansas*

Observations of microscopic sections of the wood of this shrub reveal many interesting features. Cross sections show the water tubes to be scattered irregularly in between the medullary rays, fairly uniform in size with the exception of those tubes in the late growth, and to occupy approximately 25% of the total wood. This however is not the only means of water conduction provided for in the anatomical make up of this shrub. It was found the rays occupy about 18% of the total wood, the isolated wood fibers and xylem parenchyma about 3%, leaving approximately 55% of the wood occupied by fiber-tracheids which are also employed in water conduction.

Longitudinal radial sections show two distinct types of cells occurring in the medullary rays. In one type the cells are box-like, being on the average .05 by .06 mm., and have an abundance of stored

starch. The second type of cells are elongated radially, measuring .03 by .062 mm. While these cells contain some starch, indicating that they are alive, they do not contain near as much as the box-like cells, indicating that they are primarily for radial conduction of food and water.

Longitudinal tangential sections, show the rays to be quite frequent, there occurring 32 per sq. mm. Numerous tyloses were found within the water tubes. The fiber-tracheids, which make up the ground mass of the wood vary in length from .43 to 8. mm., are .02 mm. wide and have a thickness of .007 mm.

Abstract—An Algal Habitat in the Salt Marshes

NINA HESLER LOOMIS, *University of Southern California*

This is a short paper based on some investigations having to do with the growth of certain sea weeds in the salt marshes of Orange County, California. The habitat is described as an area with distinct divisions or portions and bearing a shifting marine flora. Observations have been made on those plants actually growing there some time during the last four years, and on the relation of their growth to the unusual habitat. The area is both submerged and uncovered each day, plants being exposed daily to light and air. The habitat Group includes the *Scinaia* Group, *Griffithsia* and *Enteromorpha*. Two circular plant bodies (possibly parasitic) grow on the *Scinaia* Group. Prof. A. C. Life of the University of Southern California discovered two large tide pools of a peculiar *Gracilaria*, growing here in 1932. Similar characteristics of the plants of the habitat Group are noted. Certain findings indicate that all members except one or two of the *Scinaia* Group may prove to be new species.

The Spontaneous Rhythmic Activity of the Rat under the Influence of Sodium Amytal and Sodium Thiocyanate

DONALD E. FLETCHER, *University of Kansas*

The purpose of this investigation was to determine the immediate and temporary effects of sodium amytal and sodium thiocyanate upon the behavior of the rat, with special reference to the effects upon its rhythmic activity.

Normal rats were placed singly and in groups on a table free from debris and studies of their individual and group behavior made over

periods of four to six hours. Different stimuli, such as loud sounds, sudden jarring of the table, brushing the fur, forcibly changing their position, and the running of the elevated maze, were introduced as tests for sensitivity, equilibrium, and muscular co-ordination. This same procedure was repeated using the same rats, half of which were injected with sodium amytal and half with sodium thiocyanate.

Activity over long periods of time were recorded by means of an ink tracing on a roll of paper. Two tracings were recorded at a time. The movements of the cages, resulting from the rat's activity within, were transmitted by means of levers to Inkograph pens. Four to six continuous twenty-four hour records were taken for each rat both under normal and narcotized conditions.

Records taken over twenty-four hour periods indicate clearly that the rat was a diurnal rhythm, as was discovered by C. P. Richter at Johns Hopkins University. It exhibits daily, hour for hour almost without exception, the same behavior pattern. The males showed greater activity than did the females while they were active, and were more quiescent while resting. No two rats had the same activity pattern, but all showed one general similarity, namely: They were more active at night and during the morning hours, but very inactive between 12 and 6 p.m. This rhythm of eighteen hours activity and six hours rest might be termed the universal rhythm pattern of the rat.

Sodium thiocyanate raised the threshold for sensitivity for all sensory stimuli. A very slight stimulus of any character produced a sudden and exaggerated response. Unless stimulated no voluntary movements were made. Negativism, irritability, and depression were marked. Equilibrium was normal, but muscular co-ordination in hind quarters was disturbed.

Immediately following the administration of sodium amytal stimulation occurred, followed shortly after by an inactive period lasting for one-half hour. The animals were calm and relaxed, eyes open, head erect. Instead of being hypersensitive they were hyposensitive. An intense stimulus was necessary in order to invoke a noticeable response. Equilibrium remained normal. Muscular co-ordination fair.

Sodium thiocyanate completely abolished the rhythmic pattern, this state lasting for two or more days with a gradual return to normal.

Sodium amytal, on the contrary, did not abolish the rhythm. There was no qualitative change in the records. The only change being quantitative. The first day showed the normal pattern in a diminished form, while the second day revealed the same pattern in an exaggerated

form indicating stimulation. A return to normal was completed after four days.

Some Factors Involved in the Augmentation of the Coronary Blood Flow Following the Intravenous Injection of Hypertonic Glucose Solution

DAVID TAYLOR LOY, *University of Kansas*

The coronary blood flow has been recorded, by means of a Morawitz cannula, in a series of thirty-one dogs.

Evidence is furnished by these experiments to indicate: (1) that the marked increase in the coronary blood flow of dogs, due to the intravenous injection of ten cubic centimeters of fifty percent glucose solution is largely due to the glucose and not to the hypertonicity of the solution, (2) that this augmenting effect of the hypertonic glucose solution is not dependent on reflex or direct stimulation of the vagal centers, and (3) that the previous administration of insulin does not alter the type of the reaction of the coronary circulation of dogs to hypertonic glucose solution.

Abstract—A Discussion of the Cestoda Found in Poultry in and around Douglas County, Kansas

By Q. B. FERRY, *University of Kansas*

The purpose of this study was to determine the tapeworms, which inhabit the domestic chicken, *Gallus domesticus*, in and around Douglas County, Kansas, and to determine also the degree of the infestations. This work was started in the Fall of 1932, and was continued until the early Spring of the following year.

The fifty domestic chickens for this investigation were procured from the Central Produce Company, a poultry house in Lawrence, Kansas. The chickens were delivered to the poultry house by different farmers in Douglas County. These domestic fowls were used for food consumption by the people of Lawrence.

This investigation deals with six species of tapeworms found in domestic chickens. Of these cestodes, three species belong to genus *Raillietina*, e. g., *Raillietina cesticillus*, *R. echinobothrida* and *R. tetragona*. With these three mentioned species, *Choanotaenia infundibuliformis* and *Hymenolepis carioca* are commonly met in this country. *Amoebotaenia sphenoides* was reported for the first time in Maryland and the

District of Columbia by Ransom in 1909. Guberlet in 1916 overlooked the report of Ransom, hence it has led to the general assumption that this species has never been introduced from Europe. My findings of *Amoebotaenia sphenoides* present a confirmation that this tapeworm has been introduced in this country. Although all of these species have been previously described I have found by a careful study various new and interesting morphological peculiarities which either differ from the previous descriptions or had been overlooked and therefore a discussion of these forms seems justified.

The Development of the Testis of the Male Guinea Pig During Immaturity

C. G. BOOKHOUT, *Duke University*

It is supposed by many that all large cells are germ cells while the small cells are soma cells and both are unchangeable throughout the life of the organism. The origin of the large cells is to be worked out in a later study but the fate of those present and the production of new cells is discussed.

The adult testis is composed of hollow seminiferous tubules but at birth these are represented by solid cords. These solid cords are composed of large and small cells. Some of the small cells divide by mitosis and others increase in size so that all transitions may be found from small to large cells. The greatest number of large cells are found at twelve days, later many of them disintegrate by clumping of chromatin, abortive mitotic divisions and in a few cases by abnormal growth followed by vacuolation. A few cells from the ninth to the seventeenth day and the majority of the cells from the twenty-first to the thirty-fourth day are in the beginning stages of maturation but they become abortive and disintegrate before division is completed. At forty days lumens are present in almost every tubule and secondary spermatocytes are found. Shortly after this is the period of puberty at which time the adult condition is attained.

The Vitamin D Assay of Corn Silage

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Michigan State College

Nineteen dairy calves and 77 rats were used to assay the vitamin D content of corn silage. Both the preventive and the curative methods of feeding were used.

In terms of total dry matter in the ration, 38 per cent of corn silage cured rickets in 10 to 12 month old calves whereas 22 per cent of corn silage failed to cure rickets in three month old calves. Similarly, 45 per cent of corn silage prevented rickets in a six month old calf but 14 per cent of corn silage failed to prevent the development of rickets in month old calves.

Addition of 7.5 per cent of dry corn silage to the basal diet resulted in much improved calcification of the femora of rats. Curative feeding tests indicated that there were 60 Steenbock rat units of vitamin D in each pound of dry corn silage.

The Effect of Subcutaneous Injections of Full Term Female Metanephric Extract upon White Rats

RALPH W. KOTTKAMP, *Kansas University*

The metanephroi were collected at a slaughterhouse, dried at 70 C., and pulverized. This material was extracted in normal saline. Subcutaneous injections were made daily for a period of ten weeks. Eleven experimentals and thirteen controls were used in the series of experiments. The results were:

1. The testes of the experimentals descended seven days later than those of the controls.
2. The testes of the experimentals were smaller at the time of full descent than those of the controls at the same period.
3. The penes of the experimentals were smaller than those of the controls from the start of descent of the testes of the controls until after full descent of the testes of the experimentals.
4. The extract did not influence the general condition of the injected animals.

The extract contains some principle that inhibits the development and descent of the testes of immature white rats. The delayed development of the penes of the injected animals was apparently due to the retarded development of the testes. The extract acted solely upon the developing genital organs and had no other influence on injected rats.

The Bromo -m- Cresols: Bactericidal Properties and Chemical Constitution

WALTER J. PETERSON, *Michigan State College*

Phenol coefficients of nitro, amino, sulphonic acid, and bromo derivatives of m-cresol, and their isomers, have been determined by the F. D. A. method, using *STAPHYLOCOCCUS AUREUS* as the test organism. Increase in the number of halogen atoms in the ring increases the phenol coefficient. Substitution with SO_2ONa , NO_2 , NH_2 , or $\text{NH}_2\cdot\text{HCl}$ lowers the disinfecting power of any dibromo-m-cresol. Isomeric nitro, amino, and monobromo-m-cresols have approximately three times the phenol coefficient of m-cresol. The sodium sulfonate of either m-cresol or any dibromo derivative, though soluble in water, is a weaker germicide than the corresponding cresol.

Genes as Single Molecules

HERBERT S. WALLACE, *University of Denver*

Since our knowledge of genes concerns only their functions, any view as to their nature must be purely theoretical, although it may be based on facts. The hypothesis that the gene is a single molecule fits in with all the known facts.

Since the position of each gene on a chromosome can be determined and since the genes are always placed a certain distance apart, they must be unit objects having position and size. Genes have structure, as is shown by their comparative stability, regularly periodic mutation, preferential direction or directions of mutation, and mutation due to X-raying. Genes are about the size of large organic molecules, as is shown by the fact that chromosome number II of *Drosophila*, which is 2.5 microns long, probably contains about 500 genes. These genes could not be larger than 1/200 microns, otherwise they would not all fit on the chromosome. 1/200 microns in diameter is within the range of size of large organic molecules. Chromosomes contain other substances than genes as is shown by their varying lengths and thickness in different cells of the same organism.

No satisfactory explanation of the division of a monomolecular gene can be given, but it is possible that the parent molecule divides to form two simpler molecules and these are subsequently built up to resemble the parent. It may be that the gene does not divide but merely causes another molecule like itself to be formed adjacent to it.

Gene mutations do occur in nature and the less striking of these mutations are certainly an important factor in evolution.

It is concluded that genes are single large organic molecules.

The Effect of a Filtrable Portion of K Medium on the Filtrability of *Escherichia coli*

O. F. EDWARDS, *Michigan State College*

When amounts less than 20 ml. were filtered through Berkefeld filters ($2\frac{1}{2}$ by $\frac{3}{4}$ inches), the filtrability of *Escherichia coli* was unaffected by K medium.

The method of fractional filtration was used for volumes of 200 ml. Each 10 ml. fraction was collected in sterile cotton stoppered test tubes by means of a sterile tubing shield.

Esch. coli grown in K medium was found to be more readily filtrable than when grown in plain beef extract broth.

Esch. coli grown on plain beef extract agar and suspended in K medium was likewise more readily filtrable than when grown in plain beef extract broth, but the effect was not so marked as when the organism was cultured in K medium.

The filtrability of *Esch. coli* was enhanced to the greatest degree when this organism was grown in the Berkefeld filtrate of sterile K medium.—Abstract.

Factors Affecting the Respiration of Vertebrate Red Blood Cells

By SAM R. TIPTON, *Duke University*

The oxygen consumption of erythrocytes of alligators, chickens and rabbits was studied during anemia produced experimentally either by venesection or the intraperitoneal injection of phenylhydrazine hydrochloride. The number of red cells, corpuscle volume, concentration of iron and the histological blood picture after staining with cresyl blue were determined throughout the course of the anemias.

The duration of anemia in alligators was from four to five weeks, that in chickens about ten days and in rabbits about twelve days. The rate of regeneration of erythrocytes as determined by the restoration of equal percentages of iron concentration was fastest in chickens and slowest in alligators. The rate of regeneration of the red cells in rabbits was intermediate.

The respiration of "primitive red blood cells" was found to agree roughly with the percentage of cells containing reticular material in the cytoplasm which could be demonstrated by intra vitam staining with cresyl blue. Due to gradations from cells with one or two small particles to cells containing a dense reticular network exact relations could not be established. The same conditions were found in blood of chickens. In rabbits however the rate of oxygen consumption and the percentage of reticulocytes were almost exact correlates. Cytoplasmic material is the chief structural factor in the respiration of erythrocytes of rabbits while in those of alligators and chickens the nucleus is an additional factor.

Phenylhydrazine when added to mature red cells of chickens *in vitro*, turns the cells dark brown in the presence of oxygen. These brown cells have a higher rate of oxygen consumption than do red cells that have not been treated with the poison. The oxygen consumption of the brown cells is maintained rather constant in the absence of dextrose. However, if dextrose is added the rate of oxygen consumption increases and the increase is proportional to the concentration of dextrose added. The oxygen consumption is completely inhibited by 0.01 molar KCN. Certain differences, however, between the respiration of these cells and the respiration of cells drawn from animals injected with phenylhydrazine indicate that the increased respiration of the latter is a normal cellular respiration and not one induced artificially by direct effect of phenylhydrazine hydrochloride on the red cells.

Microsporogenesis in *Philadelphus grandiflorus*

LEWIS E. ANDERSON, *Duke University*

Both the heterotypic and homoeotypic divisions were worked out in detail. The chromatin of the pollen mother cell is distributed in the form of a network which becomes threadlike. Pairing of threads is noticeable at the beginning of synizesis. During synizesis synapsis occurs. When the synizetic knot loosens loops are thrown out in the nuclear cavity and the spireme is single. The threads gradually extend out and form the open spireme. There is no indication of a second contraction. The spireme undergoes marked shortening and condensation. During open spireme a longitudinal fission occurs and the double nature of the spireme thread is revealed. Transverse segmentation takes place and 13 bivalent chromosomes are formed, which shorten

and thicken and enter diakinesis. A tripolar spindle forms, the poles of which fuse and become bipolar as the chromosomes take their places on the equatorial plate. Disjunction is regular. In late anaphase the chromosomes split. Interkinesis is short. Homootypic divisions occur with no irregularity and the four-nucleate condition results. Microspores are cut off by an invagination of the cell wall of the tetrahedron and furrowing of the cytoplasm.

The Prenatal Effect of Carbon Monoxide on Albino Rats and the Resulting Neuropathology

LLOYD L. WELLS, *University of New Hampshire*

The following results of experiments on the prenatal effects of carbon monoxide on albino rats are taken from a series of continued experiments started in the fall of 1930 at the University of New Hampshire by Miss Eleanor L. Sheehan, continued during the years 1931 and 1932 by Mr. Robert L. Richards, and completed this year by the author.

Miss Sheehan found that apparently exposure of pregnant rats to a 0.59 percentage carbon monoxide gas for ten doses given every other day during the period of gestation affected the offspring in only a small percentage of cases.

Mr. Richards' experiments proved the fact that carbon monoxide in some cases affects the prenatal development of rats exposed to 1.5 percent gas. The litters were either aborted or absorbed. The offspring of experimental rats did not grow as normal litters; which may be due to a metabolic upset in the mother affecting the mammary glands, or the carbon monoxide poisoning the oxidative enzymes during prenatal development. The adult rat builds up a resistance to carbon monoxide and in general the time of exposure causing unconsciousness increases but the resistance is only temporary.

The experiments this year show that an increased number of exposures of individual rats causes a higher percentage of abnormal prenatal development and of small and abnormal litters. The amount of gas usually administered was 1.5 percent carbon monoxide to which the rat was exposed until the point of unconsciousness was reached, an average time of from five to eight minutes. Each rat received about ten doses of gas, given every other night during the period of gestation. During these experiments the doses were increased to every night during the gestation period with the results noted above. Control groups were run with all experiments to check the growth, development and

characteristics of all litters. The average life of the experimental animal is less than that of the control.

The usual treatment of ten doses of 1.5 percent carbon monoxide gas given every other day during the gestation period does not apparently affect the nervous system of either the mother or the offspring, no trace of nerve tissue disintegration being found. However, in concentrated doses, as those given every day during the gestation period, pathological conditions of the nervous system were found in the mother but not in the offspring. There is a slight edema of the nerve cells of the cortex and of the nucleus of the hypoglossal nerve, with a central chromatolysis and distorted nuclei. No change in the corpus striatum or thalamus. No areas of hemorrhage were found. The other nuclei were apparently unaffected.

The Embryology of the Spleen in *Amia calva*

HARVEY DE BRUINE, *University of Michigan*

Critical stages in the development of the spleen were established. The organ originates from the mesenchyme along the outer wall of the subintestinal vein. Migration and multiplication of the cells and an accompanying condensation of the tissue, in larvae between 7.5 mm. and 10.0 mm. body length, occurs to establish the splenic primordium—the loose mesenchyme bed. Further shortening and thickening of the primordium, in larvae between 10.0 mm. and 12.5 mm., occurs to form the club-shaped spleen. Subsequent bending and lobation occur to form the hooked spleen of the adult.

Graphic representation of spleen length in relation to body length indicates an absolute shortening of the organ in larvae between 12.0 mm. and 15.0 mm. However, the curve representing changes in volume with increasing age is a sigmoid or normal growth curve.

Vascularization occurs through the incorporation of the splenic artery and vein, branches of the posterior intestinal artery and vein, within the contour of the organ to form the primary system and subsequent growth and branching to form the secondary and tertiary vessels. Ellipsoidal sheaths surround the arterial terminations and stigmata occur in the walls of the venous spaces. The circulation in the pulp is an open one.

Observations on the histogenesis of the spleen indicate that the organ is active in hemopoiesis, hemolysis of erythrocytes and storage of all blood cells.

Notes on Carrion Insects of Oklahoma

WILTON FISHER, *University of Oklahoma*

1. The stages in decomposition of carrion may be divided as follows:

1. Fresh.
2. Odiferous.
3. Softening.
4. Pasty.
5. Greasy bones.
6. Dry bones.

2. Succession of forms in carrion as indicated by dominant forms:

1. Fresh flies, ants, wasps.
2. Odiferous flies, ants, wasps, small Scarabs and Histerids appearing.
3. Softening Flies (larvae), Scarabs, Histerids, ants.
4. Pasty Silphids, Staphylinids, Histerids, Scarabs, flies, ants.
5. Greasy bones...Ants, Silphids, Trox, Scarabs (larvae), Histerids, Staphylinids.
6. Dry bones Necrobia, Dermestids, ants, Trox.

3. *Effect of weather on decomposition of carrion.* There is clearly a close relationship between rate of decomposition and humidity. A high humidity causes greatly increased activity of larvae and bacteria in the carrion. In times of low humidity, temperatures from 60°-75° F. seem to produce the greatest activity.

Under dry conditions, only about 20-30% of the blow-fly eggs hatch. Under wet conditions 70-80%. The time of hatching is 4-6 hours earlier when the humidity is high.

If a rain follows soon after the placing of carrion, the skeleton is stripped of flesh within 48 hours. If it does not rain it takes over 100 hours.

4. *Comparison of carrion insects in Latimer and Comanche Counties.* More families of carrion beetles are found in Comanche County, but in Latimer County more individuals and species were taken within the families represented.

Paleontology and Correlation of the Upper Cretaceous Beds Along the Eastern Side of Laguna de Mayran, Coahuila, Mexico

RALPH W. IMLAY, *University of Michigan*

Fossil collections made during the summer of 1932 from Upper Cretaceous beds along the eastern side of the Laguna de Mayran in southern Coahuila, yielded a mollusk fauna of 63 species of which 1 is a cephalopod, 28 are gastropods, and 34 are pelecypods. The fossils were collected entirely from the lowermost of two formations studied, which consists predominately of sandstone and is at least 12,000 feet thick, and definitely correlate it with the Taylor marl of Texas and the Pierre shale of the Western Interior region. The faunas show a mingling of species of which some are peculiar to the Gulf region, others to the Western Interior region, and some are indigenous or peculiar to more tropical waters than occurred in the United States. The Gulf fauna predominates both in numbers and species.

A Study of Some Parasites of Rabbits of Central Oklahoma

J. W. WARD, *University of Oklahoma*

Fifty-two *Sylvilagus floridans* (cotton-tails), seventeen *Lepus californicus* (jack rabbits) and four *Lepus aquaticus* (swamp rabbits) from eighteen areas of central Oklahoma were autopsied for parasites. Examinations for external parasites were made of the following organs: frontal sinus, nasal sinus, orbital sinus, muscles, thoracic, abdominal and pelvic cavities. Smears were made of spleen, liver, blood and feces.

Parasites found were grouped as follows: eight species of Arthropods, four Cestodes, seven Nematodes and five Protozoa.

ARTHROPODS.

1. Fleas.

Hoplopsyllus anomalis, the rabbit flea, was found on all rabbits; *Spilopsyllus simplex* on ten cotton-tails; *Ctenocephalus felis* on one cotton-tail.

2. Mites.

Trombicula irritans, harvest mite, on all rabbits collected in summer and early autumn, was present on three per cent of others; *Psoroptes communis cuniculi*, ear itch mite, on six cotton-tails, two jack rabbits, and one swamp rabbit.

3. Sucking lice.

Haemodipsus leporis, sucking louse, from three jack rabbits.

4. Ticks.

Haemophysalis leporis-palustris on ten cotton-tails, six jack rabbits, and one swamp rabbit; *Ixodes marxi*, one specimen from a jack rabbit.

CESTODA.

1. *Cysticercus pisiformis*, cystic stage of *T. pisiformis*, from thirty-two cotton-tails, one jack rabbit, and two swamp rabbits.
2. *Multiceps serialis* from six jack rabbits.
3. *Multiceps packi* from two jack rabbits.
4. *Cittotenia ctenoides* from fourteen cotton-tails, two jack rabbits, and one swamp rabbit.

NEMATODA.

1. *Hepaticola hepatica* from one cotton-tail.
2. *Trichuris leporis* from two swamp rabbits.
3. *Passalurius ambiguus* from twelve cotton-tails and three jack rabbits.
4. *Obeliscoides cuniculi* from sixteen cotton-tails, three jack rabbits, and two swamp rabbits.
5. *Graphidium strigosus* from six cotton-tails and one swamp rabbit.
6. *Nematoda leporis* from three jack rabbits and two swamp rabbits.
7. One unidentified nematode from submucosa of gall-bladder of a jack rabbit.

PROTOZOA.

1. *Eimeria stiedae* from seven cotton-tails and two jack rabbits.
2. *Trypanosoma* sp. from two jack rabbits and one swamp rabbit.
3. *Giardia duodenalis* from fifty-three cotton-tails, eleven jack rabbits, and one swamp rabbit.
4. *Endamaeba cuniculi* from four cotton-tails and two jack rabbits.
5. *Enteromonas intestinalis* from four cotton-tails, two jack rabbits, and one swamp rabbit.

A Contribution to the Polyporaceae of New York State (Pileate Species)

JOSIAH L. LOWE, *University of Michigan*

This manual includes one hundred forty-six species and four varieties fully described under eight genera: Polyporus, Favolus, Trametes, Daedalea, Lenzites, Cyclomyces, Fomes, and Ganoderma. The genus Poria is omitted. The list of species was obtained by a study of the specimens in nearly all the herbaria containing large collections of New

York State polypores, and was supplemented by field work and by literature records. These, when unusual, were checked by an examination of the original specimens. For the first time two species, *Polyporus trabeus* Rostk. and *P. albidus* (Schaeff.) Fries are reported from the United States, and two species, *P. subradicatus* Murr. (under *P. melanopus*) and *P. caesiosimulans* Atk. (under *P. caesius*) are reduced to synonymy. Observations on misdeterminations and doubtful records follow each genus. Two plates illustrating the characters used in the taxonomy of the species and a glossary of the technical terms are included. The paper will be published as a technical bulletin of the New York State College of Forestry at Syracuse University, and will appear about September, 1933.

The Secretory System and Resinous Secretions of *Liatris Scariosa*

M. W. MAYBERRY, *Kansas University*

The paper discusses the secretory systems of the various plant parts of *Liatris scariosa* as to their origin and structure. A brief explanation is given concerning the microchemistry of the canal contents.

A Study of Some Factors Influencing Germination of the Spores of *Phyllosticta Solitaria*

IRMA A. BURGERT, *University of Kansas*

Studies were made of the effect of various factors on germination of spores of *Phyllosticta solitaria* E. & E. taken from culture and from bark cankers. Spores taken from cultures at least four weeks old were found to germinate best. Good germination was observed at the end of twenty-four hours after sowing but higher counts were obtained when the spores were examined on the second day. The spores were found to germinate readily in distilled water. The minimum, optimum, and maximum temperatures for spore germination were found to be 5° C., 21°-23° C., and 39° C. respectively. Spores from pycnidia in bark cankers showed consistently lower germination than spores from culture: however, the minimum, optimum, and maximum temperatures for germination were the same in both cases. When, instead of percentage germination, average germ-tube length (taking into account both germinated and ungerminated spores) was used as a measure of viability, the results agreed, in nearly every case, with those obtained by the former method. There was an increase in spore germination in bark decoction and potato-

dextrose broth as compared with distilled water. There was a slight increase in Coons' solution but tap water, rain water, apple fruit juice, and K. U. solution had an inhibitory effect. Of various tissues placed near the germination drop, bark tissue acted as a stimulant, apple bark being the most effective. Orange tissue (rind and fruit tissue), onion scale and shoot, and apple fruit tissue inhibited spore germination somewhat. Spore germination was not appreciably affected by varying degrees of light. Although spores formed in culture will germinate almost as soon as they are formed they germinate best when ten days or two weeks old. Thus it seems there is an interval between morphological and physiological maturity of spores formed in culture as well as in nature.

A Detailed Study of the Gross Anatomy of the Brain of the Gar Pike, *Lepisosteus osseus*

HAROLD ZINTEL, *University of Akron*

This study was made from six specimens obtained from the Portage Lakes, Akron, Ohio. Careful dissections were made and any results were closely compared with the only available study similar to the present one, that of Balfour and Parker, 1882, found in the transactions of the Royal Society for that year.

Although much remains to be studied more in detail the following conclusions were determined:

- (1) Presence of a non nervous body atop of the myelencephalon, not previously mentioned or studied.
 - (2) Presence of much smaller infundibulum than that indicated by Balfour and Parker.
 - (3) No large vesicular thalamencephalon as drawn and described by Balfour and Parker.
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Mitochondrial Morphology in Diuresis

GILBERT M. BLUNT, *State College of Washington*

The domestic cat was chosen as the experimental animal and the groups carefully selected as to age, sex, and condition. Temporary diuresis was produced by the intraperitoneal injection of urea; long-continued diuresis by unilateral nephrectomy.

It was found that the normal kidney is divided into active and inactive units; the unit comprising roughly the tubules served by a single

interlobular artery and vein. The mitochondria of the active proximal convoluted tubule are in the form of rods, solid spheres, hollow spheres, and granules. There is an extrusion of mitochondrial material from the apices of the cells. The direction of secretion is proximodistal, i.e. *into* the lumen.

In the diuretic kidney there is an increase in granular and spherical chondriosomes. Temporary diuresis causes secretion by the entire organ. Unilateral nephrectomy produces, in the remaining kidney, a condition similar to that of temporary diuresis, with a progressive hypertrophy and lengthening of the glomerulo-tubular units. As compensatory hypertrophy advances the chondriosomes assume a more normal configuration.

Grain Stain and Differential Staining

M. L. KAPLAN AND LEAH KAPLAN, *Hunter College*

Each of four previous hypotheses to explain the Grain stain can be shown to be untenable.

Grain positives act in a manner indicating a low permeability to iodine and to dye in alcoholic solution. This, combined with the low alcohol-solubility of the dye-Iodine compound, is probably the cause of dye retention by positives in the Grain test.

Methods are described for measuring the degree of permeability to alcoholic Iodine. This makes possible the differentiation of species of grain positives by means of iodine numbers denoting the back pressure needed to prevent the escape of dye and iodine, and by means of a study of intracellular patterns produced. An accurate determination of the Grain reaction of borderline organisms is also made possible.

Differences in permeabilities of positives and negatives in aqueous medium can be demonstrated by the use of dye pairs.

Interesting phenomena of slime formation and beading when permeabilities are altered by the use of alkalis, are also described.

The Life History and Habits of a New Species of Checkered Beetle of the Genus *Aulicus* Spinola (Coleoptera, Cleridae)

E. GORTON LINSLEY, *Oakland, California*

The beetle family Cleridae is represented in North America by about three hundred species. They are often marked with brilliant and beautifully contrasting colors and have been given the name checkered beetles.

In Europe and America the life histories of the species have been extensively studied because of the importance of clerids in the control of destructive forest insects. These studies have revealed two types of life history. There are (1) species which, as larvae and adults, are predaceous on wood-boring beetles, and (2) species which live in the nests of bees and wasps.

The first group includes the majority of the known species. As larvae they feed upon the eggs and young of wood- and bark-boring beetles and when full grown they feed upon the adults of the same. Most of these species are diurnal and may be observed running rapidly over the trunks and branches of infested trees, in the bright sunlight. A few, however, sombre colored and ant-like species, are nocturnal, ovipositing and feeding at night and hiding in the day beneath bits of bark and debris.

The second group includes only the members of the genus *Trichodes*. In this genus the larvae are predators in the nests of bees and wasps. The adults, having lost the predaceous habit, feed exclusively upon the pollen of flowers. They deposit their eggs upon plants which are frequented by bees and wasps and these carry the young larvae to their nests.

No life history observations have ever been recorded for any member of the genus *Aulicus*. The larval forms remain undescribed and even the adult beetles are rare and seldom met with. A brief study of the habits of *Aulicus terrestris* Linsley, however, indicates that this species represents a third type of life history. The beetles live not on trees or flowers nor in the nests of bees and wasps, but upon the ground. The larvae appear to feed upon the egg masses of a lubber grasshopper and the adults prey upon the larvae of certain moths. Whether or not the habits of this species are characteristic for the genus as a whole is not at present known, for *Aulicus terrestris* is the only species which has ever been found in sufficient numbers to permit a study of this kind.

LIFE HISTORY OBSERVATIONS

Studies in the biology of *Aulicus terrestris* Linsley were made on the eastern slopes of Mt. Diablo, California, during the months of May and June 1932. In this region there are two small colonies of this beetle, each covering an area of about one hundred yards in diameter which are the breeding grounds of the lubber grasshopper, *Esselesia vanduzeei* Hebard. The colonies are located on dry, barren hillsides at a distance of about three-quarters of a mile apart. The soil is rather scanty, derived from serpentine rock, and at the season in which the beetles are active, it

is covered with dry grass. Although an extensive search was made of the whole region, no other colonies of either the clerid, or the grasshopper were found.

The adult beetles begin to appear in late April and early May and have usually disappeared by the end of the first week in June. This period coincides with the period of adult activity of the lubber grasshopper.

Upon emergence, the female is completely ignored by the male. She flies about in an erratic manner until she scents the larva of some lepidopterous insect. She alights within a foot or so of her prey and runs rapidly about until she sees it. She then pounces upon the larva and grasping it behind the neck she quickly pierces the skin with her powerful jaws. The larva squirms about, rolling over and over in an effort to dislodge her. From the break in the skin, however, the body liquids begin to exude and the struggles are soon over. The clerid gorges herself upon the juices of her victim. She feeds voraciously and within a few minutes there is a perceptible increase in the size of her abdomen. After five or ten minutes of feeding her abdomen has become distended many times beyond its natural size.

When the female has been feeding for fifteen or twenty minutes, the male usually appears. He circles about and after making several false landings finally locates her. Copulation takes place while the female continues eating. Before the larva is completely eaten, a process that usually requires twenty to thirty-five minutes, several more males usually arrive. These approach as did the first male, but leave after a few unsuccessful attempts to dislodge him. When the female has had her fill, leaving only the larval skin uneaten, she spends several minutes in cleaning her "face" and mouthparts with her front pair of tarsi and then crawls up a blade of grass until copulation is completed.

Deposition of eggs usually takes place within thirty-six to seventy-two hours after copulation. Under laboratory conditions the females deposit between twenty-eight and forty-two eggs at one time but in the field the eggs appear to be laid singly. The eggs are deposited under stones or in the soil near the egg masses of the lubber grasshopper. In the laboratory, the eggs are deposited on paper in preference to stones, earth, wood, or cotton.

The larvae roam freely about beneath rocks or under the surface of the soil and probably feed upon the egg masses of the grasshopper. The abundance of these egg masses, the great percentage of these which have been eaten, and the fact that there is apparently no other suitable food

for the larvae, all suggest that the larvae must depend on these for their existence. Laboratory experiments could not be utilized to settle this point definitely since under such conditions the larvae of most clerids will eat anything that is offered to them.

CONCLUSIONS

From these observations which have been derived from a study of more than two hundred living *Aulicus* both in the laboratory and in the field, I would conclude:

(1) That large quantities of food are necessary for the development of the eggs in the body of the female.

(2) That the female is unattractive to the male until she has fed.

(3) That the normal food of the female consists of hairless larvae of various Lepidoptera, in particular the noctuid moths.

(4) That the adult male rarely takes food.

(5) That there is a definite relationship between the beetles and the lubber grasshopper, *Esselenia vanduzeei* Hebard.

The Stimulation of Cell Division of Reduced Sulphur Compounds

G. OLIN RULON, *University of Oklahoma*

In an effort to test the validity of the hypothesis of Hammett that reduced sulphur compounds will stimulate cell division the following sets of experiments were performed.

(1) Egg masses of the snail, *Physa*, were taken when first laid, washed in dilute acid and divided into three parts. The parts from the same mass were placed in different solutions as controls and tests. The average time of first cell division, from the time of laying, of eggs placed in a 1-4000 solution of cystine (pH 5.4) was 65 minutes. The average time of first cell division of eggs in a control solution at the same pH was 103 minutes. The average time of first cell division in spring water (pH 7.2) was 85 minutes. Second and third cell divisions also show the stimulating action of cystine.

Cell division is inhibited in snail eggs in 1-1000 solutions of cystine (pH 5.4), 1-4000 solutions of cystine (pH 7.2), acid solutions below pH 6, and hypotonic solutions.

(2) A number of small cricket frogs, *Acris gryllus*, were washed in dilute HCl and trapped in 1-4000 cystine solution, pH 5.4, for 72-96 hours. Control frogs were maintained at the same pH. Cytological

examination of the abdominal epithelium showed an increased number of mitotic figures in the frogs submitted to the cystine solution.

An Investigation of the Inequality of the Phagocytosis Exhibited by Leucocytes in a Pyogenic Infection— (Gonorrheal Urethritis)

WILLIAM P. BOGER, JR., *Bucknell University*

This paper is an investigation directed along a line of procedure indicated by the Arneth classification of leucocytes, in an effort to account for the unequal phagocytosis observed among leucocytes in a stained preparation of pus taken from a patient suffering acute gonorrheal urethritis.

The material used for this investigation was obtained from patients suffering from the disease in its incipient and advanced stages. From stained preparations made from smears of pus, a study was made of consecutive leucocytes in terms of their Arneth classification and the degree of phagocytosis exhibited. At the same time was noted the phagocytic activity and the Arneth classification of all leucocytes adjacent to or in contact with a leucocyte which demonstrated marked phagocytic properties.

The findings from this study of the consecutive leucocytes are arranged to show (1) the percentage of cells in each of the five Arneth classes, (2) the average phagocytosis within each class, (3) the number of cells exhibiting phagocytosis which occurred in each class, (4) the range of phagocytosis as exemplified by two different cells within the same class.

These data are then compared with the Arneth indices of the blood of the patient taken at the same time as the specimen of urethral pus was collected, in order to establish the relationship which exists between the Arneth index as applied to the leucocytes in the blood smear and as applied to the leucocytes classified by the Arneth scheme which appear in a smear of pus taken from the locus of infection.

A Study of the Bacterial Flora of Raw and Pasteurized Milk

E. GEORGE MARKIN, M.A., *University of Montana*

1. For the first 12 hours after pasteurization when milk is kept at 10 C. there is a lag period which shows no bacterial growth. After 24

hours the bacterial growth begins to increase as rapidly in pasteurized milk as it does in raw milk.

2. Pasteurization of the milk always increased the per cent of acid producers that were present in milk, but after 24 hours of incubation at 10 C. this group was outgrown by the other groups up and until the time of souring. From this time on (up to 21 days) the acid group was found to multiply faster than the other groups, and was soon predominating. At the end of this time 72% of the colonies were of one species, producing lactic acid, coagulated milk, and having the power to partly reduce the milk; 8% were acid coagulating, but did not reduce the milk; 1.4%, alkaline; 12.7%, inert, and 5.6%, peptonizers.

3. These results show that pasteurized milk will keep from 1½ to 3 times as long as raw milk when kept at 10 C., because in pasteurized milk the lactic acid group of organisms are outgrown by the alkaline, inert, and peptonizing groups.

4. Although the pasteurized milk here studied will keep for more than 12 days at 10 C., the results show that because of the increasing number of the alkaline, inert and peptonizing groups it is not advisable to use the milk after 4 or 5 days.

5. A qualitative study of the organisms gave many different kinds. These were classified into the five different groups already mentioned. Of the acid-coagulating group there were three distinct types: those reducing the milk at least one half or all the way up the tube, those that did not reduce the milk at all, and those producing whey. The alkaline group contained both weak and strong alkali-producers, and in several samples there were a number that would curdle the milk. Of the inert group there were two distinct types: those completely reducing the milk without changing the Ph. value, and those producing a slight change or no change in the milk.

6. Although pasteurizing the milk increased the per cent of the acid producers which are the desirable forms, it destroyed the power for them to multiply as rapidly as the other groups. Twenty-four hours after pasteurization the per cent of alkaline, inert and peptonizing groups was found to outgrow the acid producers, and continued to do so until the milk soured.

9. Raw milk soured before the maximum total plate count was reached, while pasteurized milk soured during or after the maximum total plate count was obtained. This was due to the types of organisms present. Probably for the same reason the total plate count was never as great in pasteurized milk as it was in raw milk.

CONCLUSION

1. After 24 hours the acid producing type of organism predominated in raw milk, while the alkaline, inert and peptonizing groups predominated in the pasteurized milk until souring occurred.

2. The total plate count was never as high in pasteurized milk as it was in raw milk.

3. Pasteurized milk will keep sweet from $1\frac{1}{2}$ to 3 times as long as raw milk when kept at 10 C.

4. The milk studied and used in this part of the country was found to give slightly different results from the milk produced in other parts.

5. One-tenth of one per cent of the total count would grow at 10 C., but not at 28 C.

The Thyroid Gland in Chicken Embryos

MARIE L. HOPKINS, *University of Montana*

In addition to repeating the study of the morphogenesis of the thyroid gland in chicken embryos, this paper deals with various aspects of the gland's cytological development.

As a result of a quantitative investigation of the nucleus plasma ratio of a thousand cells from each of three different developmental stages; the conclusion is that, contrary to the generally accepted opinion, as the cells become differentiated, the relative amount of cytoplasm to nucleus becomes decidedly reduced.

While agreeing in general with current views of the anatomy and morphology of the thyroid, the writer fails to substantiate in the chick some of the ideas advanced by investigators of this gland in human beings.

One point of view the author advances is that instead of always being blind sacs, the follicles in an appreciable number of observed instances, have quite definite outlets into the surrounding circulatory medium.

Some experiments of vital staining via the air chamber of the developing egg, substantiate the view that elements of the "reticulo-endothelial system" are normally present in the sinuses of this developing gland; and indicate that similar phagocytic cells in rare cases phagocytose entire erythrocytes.

The Protozoa of the Cherokee Salt Plains

NELL JANE GUTHRIE, *University of Oklahoma*

Since there have been few studies of the protozoan fauna of inland saline bodies of water, it seemed of importance to determine the nature of the protozoa found in waters in, and contiguous to, the Cherokee Salt Plains of Oklahoma.

Four sites were chosen as stations from which cultures were taken at intervals, as follows: June 22, 1930; October 18, 1930; December 12, 1930; January 30, 1931; April 11, 1931. The cultures were studied in the laboratory with careful identification of the protozoa. Ecological factors including the pH of the water and the relative salinity were considered as regards their effect upon protozoan distribution.

The protozoan fauna of these waters is not an unusual one. The majority of the forms are those normally found in fresh water, but many occur normally in both fresh and salt water. With a few exceptions the protozoa are cosmopolitan and hence are adaptable to a saline environment. Forms found in the saltiest body of water are those which have been found to endure high saline concentrations.

Addenda

The following papers, although not listed in the A. A. A. S. Program, were also read at the Convention's scientific sessions:

The Development of the Post Cardinal Veins in Relation to the Swim Bladder in *Lepidosteus*

GEORGE E. POTTER AND J. TEAGUE SELF, *Baylor University*

In previous work it has been shown that the swim bladder in *Lepidosteus* (*Lepisosteus*) has a respiratory function, that it is richly supplied with blood vessels from the aorta and that the right cardinal vein collects from it. The present paper brings out the structure of the post cardinal veins and related veins in *Lepidosteus*, and shows their origin and processes of development in relation to the swim bladder.

The post cardinal veins develop, beginning in the four millimeter stage as blood sinuses in the mesenchyme dorsal to the primitive gut, and in close connection with the mesonephroi. There is a pneumatic vein developed first in the thirteen millimeter stage. This vein collects blood from the posterior portion of the swim bladder and empties into the right

post cardinal vein. In the younger stages the caudal vein carries blood directly into the post cardinals as is the case in the adult Cyclostome, but by the fifty-eight millimeter stage the caudal has joined veins dorsal to the mesonephroi to form a renal portal system. An anal vein appears in the region of the anus and fins joining the caudal vein, and later with the development of the renal portal system, separates from the caudal to become the single posterior extension of the post cardinals.

The posterior portion of the right cardinal contributes largely to the development of an abdominal portal vein extending from the posterior root of the right post cardinal to the liver.

The adult relationships of the post cardinals have slight similarities to the conditions in Cyclostomes, Elasmobranchii and in the perch. However, the function of the right cardinal and its pneumatic in collecting blood from the swim bladder, and the anal forming the posterior extremity of the two posterior cardinals makes it very different from that found in any other teleost.

The Viability of the Spores of the Cereal Smuts

MOLLY SOBEL, *Hunter College*

1. *Ustilage avenae* spores show a longevity of $4\frac{1}{2}$ years, though occasional spores of $9\frac{1}{2}$ years have been found to germinate.
2. *Ustilage levis* spores show a greater longevity than *Ustilage avenae*, namely $13\frac{1}{2}$ years. The germination results for *levis* are uniformly better than those for *avenae*, taking them year for year.
3. *Ustilage hordei* spores show a viability of at least 7 years.
4. The longevity of a *Sphacalethea serghi* is only two years, whereas that of *cruenta* is four years.
5. Spores of both *Tilletia tritici* and *levis* have a viability of at least seven years.
6. Tap water germination yields as good results as the nutrient broth or malt extract used for *Ustilage avenae* and *levis*.
7. Insect damage, even when severe, does not reduce the germination power of the spores to any appreciable extent unless the spores have passed through the bodies of the insects.
8. *Ustilage levis* and *Ustilage hordei* show a higher germination for a collection 2 to $2\frac{1}{2}$ years old than for a more recent one.
9. Both *Ustilage levis* and *Ustilage avenae* spores require a resting period of a month or more before germination.

10. Considerable reduction of germination power is observed in *Ustilage avenae* in a period of 6 to 8 months.
 11. No relation has been observed between the color of the spore and the physiological race of the bunt spores.
 12. No relation has been observed between viability and the physiological race either in the bunts or in the covered smut of barley: *Ustilage hordei*.
-

A Microscopic Precipitation Test for Rapid Typing in Pneumonia

JULIA VINOGRAD, *Hunter College*

1. The microscopic precipitation test on coagulated sputa, like the Krumwiede-Valentine Test (4), can be performed in from $\frac{1}{2}$ to 1 hour.
 2. Only small amounts of sputum are necessary for the test.
 3. The supernatant liquid generally does not require dilution, since only minute quantities of fluid are used in the test.
 4. A positive test can be obtained with a supernatant liquid that is markedly opalescent or milky.
 5. The precipitation test on coagulated sputa, when positive, picks out the infecting type in 100% of the cases.
-

PAPERS READ BY TITLE ONLY

A New Genus and Several New Species of North American Ataxiini (Coleoptera, Cerambycidae)

By E. GORTON LINSLEY

A discussion of various genera of the tribe Ataxiini, with descriptions of *Gracilataxia* new genus (Genotype: *G. salicis* new species, Brownsville, Texas), *Esthlogena hintoni* new species, (Temascaltepec, Mexico), and *Parysatis ataxioides* new species (Tejulpilco, Mexico).

A Synopsis of the Genus *Aulicus* (Coleoptera, Cleridae)

By E. GORTON LINSLEY

A study of the genus *Aulicus* Spinola, with emphasis on taxonomy and distribution. A key to the known species is given, and a description of each, among which are the following new forms: *Aulicus terrestris* new species (Mt. Diablo, California), *A. fasciatus* new species (Santa

Inez Island, Lower California), and *A. bicinctus* new species, (Real de Arriba, Mexico).

The Longicorn Genus *Phrynidius* with the Description of a New Species from Guatemala (Coleoptera, Cerambycidae)

By E. GORTON LINSLEY

A table of the species of the genus *Phrynidius* with a description of each and notes on distribution. A new species, *P. armatus* from Chimaltenango Province, Guatemala, is described.

WHEN LIFE WAS DISCOVERED ON THE MOON

Within two years after its foundation in 1833, the New York *Sun* claimed the largest circulation of any daily in the world. Good news-gathering won some readers, but the chief cause of this mighty growth was the printing of one of the most elaborate hoaxes in the history of journalism.

Richard Adams Locke, the *Sun's* chief editorial writer, had been reading about the great astronomer, Sir John Herschel, who had been looking at the moon through a large telescope in an observatory near Cape Town, South Africa. Out of a vivid imagination Locke composed a series of articles describing how the Englishman had discovered the moon was inhabited—and inhabited, moreover, by “herds” of brown quadrupeds, having all the external characteristics of bison, but smaller.

The town sat up, forgot politics, went out and bought up every edition of the paper. Locke wrote on. Soon he was describing monsters of bluish-lead color, “about the size of a goat, with a head and a beard like a goat and a single horn slightly inclined forward from the perpendicular. The female was destitute of horn and beard, but had a much longer tail.”

New York buzzed with talk of unicorns and like wonders in the Valley of the Moon until Locke, in an incautious moment, confessed that there were no such animals. The circulation stuck, despite the revelation. The *Sun* was made. Edgar Allan Poe's balloon hoax, the story of a balloon that crossed the Atlantic in three days, which the poet sold to Moses Yale Beach, second owner of the *Sun*, in 1844, lasted but a day. Locke's stories ran for weeks.

—*News-Week*.

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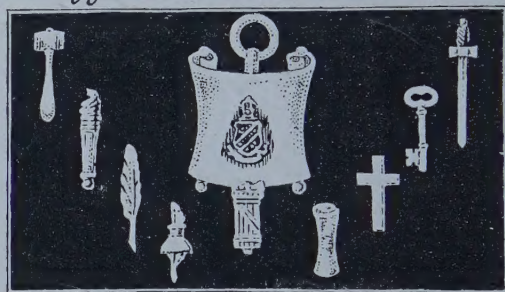
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